PORE WATER SAMPLING REPORT

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ACRONYMS AND ABBREVIATIONS

μg/L	micrograms per liter
ACR	acute-to-chronic ratio
COC	constituent of concern
EC50	median effective concentration
FDRTC	Final Decision and Response to Comments
FMC	FMC Corporation
ft	foot
GPS	global positioning system
HI	hazard index
HQ	hazard quotient
in.	inch
Koc	organic carbon partition coefficient
LC50	median lethal concentration
L/min	liters per minute
mg/L	milligrams per liter
mL	milliliter
ppt	parts per trillion
QSAR	quantitative structure activity relationship
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SCV	secondary chronic value
SLERA	screening-level ecological risk assessment
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic analysis

1 INTRODUCTION

FMC conducted pore water sampling in accordance with the pore water sampling and analysis plan (SAP; ERM 2011) and pore water sampling and analysis plan addendum (SAP addendum; ERM and Integral 2012), approved by the U.S. Environmental Protection Agency (USEPA) on July 26, 2011 and April 5, 2012, respectively. This document presents the results of pore water sampling completed adjacent to the western and southern boundaries of the FMC Corporation (FMC) property located at 1701 East Patapsco Avenue in Baltimore, Maryland (the Site; Figure 1). A preliminary screening-level ecological risk assessment (SLERA) based on the pore water sampling results is presented.

The pore water sampling program, as specified in the SAP and SAP addendum, is designed to quantify the concentrations of chlorobenzene in pore water as an indication of groundwater discharge from the Site to the adjacent surface water (i.e., Curtis Bay and Stonehouse Cove). Chlorobenzene was selected as an indicator of groundwater discharge because it is the constituent detected most frequently at the highest concentrations relative to the majority of the other groundwater constituents of concern (COCs). As designed in the study, the presence of elevated concentrations of chlorobenzene in pore water would indicate that discharge of Site groundwater contamination is not being effectively controlled by the groundwater recovery system.

FMC installed and is operating a groundwater recovery and treatment system as an existing corrective measure under the provisions of Resource Conservation and Recovery Act (RCRA) Corrective Action Permit No. MDD003071875, issued by USEPA in 1989. In Section IV, Part A, of the *Final Decision and Response to Comments* (FDRTC; USEPA 2011), USEPA presents its strategy for groundwater remediation at the Site and specifies that a comprehensive study be completed to evaluate the short-term and long-term effectiveness of the existing groundwater recovery system. The FDRTC states the comprehensive study include two components: 1) two years of semiannual groundwater sampling (this sampling is ongoing), and 2) sediment and pore water sampling. Further, the FDRTC specifies an iterative approach for the sediment and pore water sampling, with the initial phase consisting of sampling and analysis of pore water and subsequent phases, if necessary, to be determined by USEPA. This report presents the results of the initial pore water sampling.

In September 2011, pore water samples were successfully collected at 11 of the 16 sampling stations specified in the SAP (Figure 2). Samples could not be collected at 5 of the stations in Stonehouse Cove at that time because the fine-grained sediments prevented pore water collection using the methods prescribed in the SAP. The SAP addendum specified protocols for sampling pore water in Stonehouse Cove using small volume peepers, which are designed to sample pore water in fine-grained sediments. That sampling was conducted in May–June 2012.

The sampling results show chlorobenzene pore water concentrations well below those detected in upgradient groundwater and that, coupled with the relatively low toxicity of chlorobenzene to aquatic organisms, indicates that any chlorobenzene being transported with groundwater discharge does not pose an unacceptable risk to ecological receptors. Based on this, no additional study is needed to characterize ecological risks from groundwater discharge at the Site. The sampling results coupled with the ecological risk characterization, indicate that the groundwater extraction system is effectively mitigating discharge of impacted groundwater from the Site. The comprehensive groundwater study report will present an analysis of the effectiveness of the groundwater recovery system.

2 PROJECT APPROACH AND SAMPLING METHODS

The following summarizes the strategy and methodology applied in the collection of pore water samples.

2.1 GENERAL APPROACH

FMC, in collaboration with USEPA, developed the following approach to assess the effectiveness of the onsite groundwater recovery and treatment system relative to mitigation of groundwater discharge of Site-related constituents into surface waters. This strategy is codified in the FDRTC (USEPA 2011). The technical basis behind the strategy is presented in detail in the approved SAP (ERM 2011).

- Pore water sampling was identified as a method to assess the effectiveness of the onsite groundwater recovery system at preventing Site-related constituents from migrating off site.
- The majority of groundwater discharge from the Site is expected to occur in the intertidal zone due to the influence of the brackish bay water on groundwater flow. Thus, this was the area targeted for pore water sampling.
- Nearshore stations were selected in the intertidal zone to provide a reasonable spatial coverage along the Site shoreline. Additional “offshore” sampling stations were positioned approximately 75 ft from the shoreline in the subtidal zone along transects oriented perpendicular to the shoreline to assess if groundwater discharge is occurring further offshore.
- Provenance of the pore water (i.e., groundwater vs. surface water) was assessed through field measurements of specific conductivity and comparison to specific conductivity in Site groundwater and surface water.[1,2]
- Chlorobenzene was identified as the target analyte for the sampling effort in order to assess the effectiveness of the onsite groundwater recovery and treatment system relative to mitigation of groundwater discharge of Site-related constituents into Curtis Bay and Stonehouse Cove. Chlorobenzene is the COC detected most frequently and at the highest concentrations in Site groundwater, and chlorobenzene has a higher mobility

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[1] The SAP specifies that hydraulic head also be considered. However, hydraulic head could not be measured with the equipment selected to collect the pore water samples.

[2] The SAP specifies that pore water sampling was to be conducted at the five nearshore and five offshore locations situated along the five transects adjacent to where the highest chlorobenzene concentrations have been noted in shoreline monitoring wells; and that samples would only be collected at the remaining six locations where the specific conductance suggested the presence of groundwater and/or active groundwater discharge. All 16 of the pore water locations were sampled as part of the two sampling events.

(i.e., a lower organic carbon partition coefficient (Koc) value[3]) than the majority of other COCs in Site groundwater. For these reasons, chlorobenzene has a greater potential to migrate with groundwater discharging from the Site to Curtis Bay and Stonehouse Cove than other COCs.

2.2 PORE WATER SAMPLE COLLECTION

2.2.1 Sampling Stations

Collection of pore water samples was completed at 16 stations along the shoreline of Curtis Bay and Stonehouse Cove (Figure 2). These included 11 nearshore stations within the intertidal zone along the Site perimeter and 5 offshore stations approximately 75 feet (ft) from the shoreline. These stations were oriented along a transect perpendicular from the shoreline in areas where the highest chlorobenzene concentrations were measured in shoreline groundwater monitoring wells.

2.2.2 Well Point Sampling

Pore water samples were collected using well points from 11 of the 16 stations during field efforts conducted from September 13–20, 2011. The preferred position for the well point installation at each of the 11 nearshore sampling stations was within the rip-rap or fine-grained material above the water line in the intertidal zone (if present). However, higher than normal low tides occurred during the sampling period due to the lingering, offshore effects from tropical storms that had recently passed through the area. As a result, at most locations the low-tide water line remained within or just at the edge of the area of large exposed rip-rap on the steep banks along both Curtis Bay and Stonehouse Cove, and sediments suitable for point advancement were exposed above the water line. The uneven and slick surface of the rip-rap bank created an unsafe environment for the sampling team, and the rip-rap was judged to be too large to safely move by hand in order to access the finer grained material beneath. Based on these considerations, the sampling stations were relocated to the intertidal zone slightly beyond the toe of the exposed rip-rap. In addition to adjustments due to the tide and rip-rap conditions, several sampling stations were also repositioned due to lack of groundwater indications (as discussed in Section 2.2.2.1) or due to excessive fines in the sediments that clogged the sampling apparatus. The attempted and resulting final completed sample stations are shown on Figure 2.

Despite numerous attempts, samples could not be collected by the well point apparatus from the five pore water sampling stations within Stonehouse Cove (stations PW-8A through PW-

[3] Organic carbon partition coefficient (Koc) quantifies the affinity of an organic chemical to bind/absorb to organic matter. Absorption to organic matter in the aquifer and sediment matrix results in the attenuation of the transport of organic chemicals during groundwater flow/discharge.

11A; Figure 2). This was due to the upper portion of the sediments in this area being composed of a very soft, silty-clay material that rapidly clogged the screens for the well points and that did not allow water to pass through into the pump intake tubing. Once it became apparent, after many repeated attempts, that this material would not yield water using the well point methodology, a qualitative sediment depth survey of the Stonehouse Cove area was completed to find, if possible, areas where this material was thin or absent (based on ease of test rod penetration). The locations where sediment depth was evaluated are marked with an "X" on Figure 2. The results of this survey revealed that 6–8 ft of soft, fine-grained material is present throughout the pore water study area in Stonehouse Cove. As is described in Section 2.2.3, small volume peepers were deployed at a later date to sample stations PW-8A through PW-11A.

2.2.2.1 Well Point Installation

Two different approaches were used to install the well points (push-point sampling and vessel mounted Vibracore device sampling). The installation approach depended on the subsurface conditions encountered at each location. The push-point samplers were the preferred method of installation, as penetration of the point to the target depth could be achieved by hand. The Vibracore was used as a contingent apparatus where bottom or subsurface conditions may have prevented the installation of the push-point sampler to a sufficient depth by hand. This method was attempted at only one location (PW-03B), primarily in an effort to provide comparative water level head data between the pore water and surface water. Regardless of the type of push point used, the samplers were installed so that the screened interval was at a depth of 8–12 inches (in.) below the water/subsurface interface.

The push points utilized consisted of ¾-in. hollow stainless-steel rods fitted with a reusable drive point/sampling head (AMS Retract-a-Tip®). The well points were installed by hand, pushing to advance the point into the sediments. The drive point/sampling head consisted of a stainless steel assembly approximately 1.5 in. in diameter and 6 in. in length. The assembly includes a drive point at the base, an intake covered with a mesh screen, and a sampling barb at the top. The screen is fitted with a stainless steel sheath that is opened by pulling up 1 to 2 in. on the assembly after it has been driven to depth to allow for the screen to be exposed. The screen is approximately 2 in. in length. A disposable sampling tube was attached to the barb at the top of the assembly and was run to the surface inside the 3-ft-long threaded drive rods. Figure 3 presents a general diagram of the push-point installation and well point construction details. Because of the higher than normal low tide conditions, all work was conducted from a pontoon boat in order to provide a stable sampling platform for the workers conducting the sampling.

Alternate push-point setups were also evaluated in the field in an effort to identify the best approach for the Site conditions. These included a sacrificial drive point connected to the surface via the sample tubing, and a hollow stainless-steel drive tube. Both of these types of push points utilized circular perforations at the base to allow the flow of water into the sample tubing. However, the lack of a screen allowed sediment to fill the bottoms of the samplers, and inhibited the flow of water. Therefore, the retractable screened assembly was determined to be the most appropriate for the Site conditions.

The Vibracore system consists of a 2-in.-diameter, threaded stainless steel tube that is driven approximately 1 ft into the subsurface with a boat-mounted hydraulic device. The larger diameter is needed to provide strength to withstand the driving force of the vibrating hammer. Once this tubing was advanced to seal off the surface water and upper sediments, the push point was then advanced by hand inside the 2-in.-diameter tubing and installed as described above.

The horizontal coordinates of well points, including those points that were attempted but not sampled, were measured using a hand-held global positioning system (GPS) device capable of locating to within sub-1-ft accuracy.

2.2.2.2 Well Point Pore Water Sampling Procedures

Once a well point was advanced to the target depth, each well point was then purged using a peristaltic pump fitted with disposable Tygon intake and discharge tubing and a disposable silicone bladder. The intake tubing was connected to the barb at the top of the screen assembly. The well points were purged at the lowest rate feasible (approximately 0.5 liters per min (L/min) or less). Purging continued until at least one volume of standing water had been removed from the casing. The pore water samples were collected by directing the discharge from the tubing of the pump to the laboratory-supplied 40-milliliter (mL) volatile organic analysis (VOA) vials. Samples were collected with as little agitation or disturbance as possible.

As is discussed in the SAP, field measurements of pore water specific conductivity, temperature, and hydraulic head were attempted as a means to assess if groundwater discharge was likely occurring at a given pore water sampling station. It was not possible to collect water level head measurements at the 10 stations where the push-point set-ups were utilized. This is because the water level did not rise above the top of the Retract-A-Tip sampling drive head. As a result, the water level could not be visually determined. Further, the rods are too narrow to permit the use of a probe to measure the water level. The Vibracore was utilized at one location (PW-03B) specifically to allow for determination of comparative water level readings. However, the recharge rate was overly slow (approximately 5–10 mL/min), such that waiting the required time for full water level equilibration was impractical. As a result, hydraulic head was not used as an indicator of groundwater discharge.

Pore water temperature and conductivity were measured from the well point discharge during purging using a portable meter. The probe was calibrated daily in accordance to the manufacturer specifications and decontaminated prior to deployment at each station. The pore water temperature and specific conductivity readings collected at the start of and during purging were compared to Site groundwater values for these parameters measured in adjacent shoreline wells during recent monitoring events, as well as to field readings of surface water temperature and specific conductivity measured immediately prior to purging the well point. The results of the field parameter measurements are presented in Table 1.

2.2.3 Small Volume Peeper Sampling

Pore water samples were collected from Stonehouse Cove using a Modified Hesslein In-Situ Pore Water Sampler, more commonly called a “small volume peeper.” A small volume peeper operates based on the principle that, given enough time, a volume of water contained in the sampler will equilibrate with the surrounding pore water as pore water solutes diffuse through the sampler membrane. A diffusion-based sampler is ideal for locations such as Stonehouse Cove, where fine-grained sediments preclude the collection of pore water through advective-based sampling techniques (e.g., well points).

The small volume peeper, shown in Figure 4, consists of three parts: a 1.3-cm-thick acrylic body, a 0.3-cm-thick acrylic cover, and a 0.45-micrometer Teflon® dialysis membrane. The 6- by 18-in. sampler body is equipped with a series of approximately 10-mL sample chambers spaced at 1 cm. This sampler is capable of collecting approximately 200 mL of water over a 15-in. sediment depth. Prior to deployment, the sampler body was laid flat and the chambers overfilled with deionized water. The membrane was then placed atop the sampler body and was overlain by the sampler cover. Screws were used to secure the cover to the sampler body and to seal the membrane against the sampler body such that there is no air entrained in the sample chambers. The cover has openings co-located with each sample chamber, so that the membrane is exposed to the sediment subsurface once the sampler is deployed.

The peepers were deployed May 23, 2012, by pushing the peepers directly into the sediments to a total depth of approximately 12 in. The peepers were left in place to equilibrate for a 27-day period. This time frame is equivalent to or exceeds the time frame most often applied for diffusion-based samplers (USEPA 2001; Lorah et al. 1997; Adams 1991; Brumbaugh et al. 1994; Sarda and Burton 1995). The peepers were retrieved on June 19, 2012, and brought to surface for immediate processing. Three peepers were deployed at each station.[4]

The first two peepers from each sampling location were processed as quickly as possible after retrieval to minimize the potential for volatilization of chlorobenzene during processing. Water was extracted from each of the sample chambers by inserting a needle through the membrane and extracting with a syringe. Each VOA vial was filled with water from sample chambers distributed across the bottom third of the peeper to ensure that the water added to the vial is

[4] Five total peepers were deployed at location PW-08 to allow for collection of a field duplicate and quality control/quality assurance samples (matrix spike/matrix spike duplicate) per the SAP.

vertically representative of the 8- to 12-in. depth interval of sediment.[5] The water extracted from the peeper was transferred to the sample VOA vials and the vials sealed with no headspace.

The third peeper from each sampling location was used for measurement of specific conductivity and temperature. Water was extracted from across the bottom third of the peeper per the methods described above and transferred to a beaker for measurement of specific conductivity and temperature using a portable meter. As specified in the SAP addendum, specific conductivity was used as the primary indicator of potential groundwater discharge, as the temperature readings were likely influenced by solar heating during the period of time required to transfer the sample from the peeper to the beaker.[6] The meter was calibrated daily and both the meter and the beaker rinsed with potable water prior to deployment at each sampling station.

2.3 SAMPLE CUSTODY AND ANALYSIS

Chain-of-custody forms were used to provide a record of responsibility for sample collection, transport, and submittal to the laboratory. Chain-of-custody forms were filled out by the field team at a minimum of once per day at the conclusion of the sampling activities. The original chain-of-custody form accompanied the Site samples to the laboratory, with a copy retained by the sampling team. Samples were stored on ice to maintain a temperature range of 0–4°C. The samples were sent to Accutest Laboratories located in Dayton, New Jersey. All pore water samples were analyzed for chlorobenzene via USEPA Method 8260B.

2.4 FIELD DECONTAMINATION

To prevent cross-contamination, nondisposable sampling equipment such as the push-point rods and drive point/sampling head were decontaminated prior to use, between sample stations, and prior to leaving the Site. The points were disassembled into their component pieces during decontamination. In general, decontamination of nondisposable sampling equipment involved the use of Alconox detergent and potable water scrub, followed by a potable water rinse, distilled water rinse, and towel dry. New tubing was used for each sampling point and therefore was not decontaminated for reuse.

Dedicated small volume peepers, disposable syringes, and needles were used at each station. The peepers and other sample equipment and meters were decontaminated prior to use and prior to leaving the Site. Decontamination involved the use of Alconox detergent and potable

[5] This is consistent with the sampling interval for pore water collected at the Site using well points.
[6] Peepers cannot be used for measurement of hydraulic head.

water scrub, followed by a potable water rinse, distilled water rinse, and air drying. Sampling equipment was rinsed free of sediment prior to leaving the Site.

2.5 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All disposable materials (i.e., tubing, personal protective equipment, waste sample point construction materials) were containerized for disposal offsite. Water purged from the well points was discharged into the corresponding surface water body in the vicinity of sampling. Decontamination liquids were treated in the onsite water treatment facility.

2.6 DATA QUALITY ASSURANCE

Quality control and quality assurance samples were collected and analyzed to permit validation of the analytical data and verify that the data are acceptable. Quality control samples were collected in accordance to the SAP and SAP addendum and included equipment rinsate blanks, trip blanks, blind duplicates, and matrix spike/matrix spike duplicates. All quality control and quality assurance samples were analyzed for chlorobenzene by Method 8260B by Accutest Laboratories located in Dayton, New Jersey.

Accutest Laboratories provided the results and the associated Contract Laboratory Program-like data packages. The analytical results were validated following standard USEPA Region III procedures. The validated data is presented herein.

3 SUMMARY OF SAMPLING RESULTS

This section summarizes the results of the field parameter (specific conductivity and temperature) measurements and chlorobenzene analytical results in pore water.

3.1 FIELD PARAMETER DATA

The pore water sampling approach, as presented in the SAP, involves the use of specific conductivity and temperature measured in pore water as an indicator of groundwater discharge. A criterion of pore water temperature or specific conductivity readings that were greater than 50 percent of the difference between the temperature or specific conductivity measured in groundwater and surface water (i.e., the pore water specific conductivity or temperature was closer to that of groundwater than surface water) was applied as a basis for determining if groundwater discharge is likely to be occurring at a given pore water sampling station.

The temperature and specific conductance data are presented in Table 1, along with the average temperature and specific conductivity measured in upgradient, shoreline groundwater wells. Temperature readings proved to be an ineffective measure for evaluation of groundwater discharge. It is likely that the pore water temperature readings were not representative of actual pore water conditions. It is believed this was largely a function of solar heating of the water in the sample tubing during purging of the well points or in the peeper during recovery.

Specific conductivity was also found to be an unreliable indicator of groundwater provenance due to its variance. Shoreline groundwater exhibits a wide range of specific conductance and, for several of the pore water sampling stations, the specific conductance in the immediately upgradient wells exhibited substantially different specific conductivity values. In these cases, two pore water target values were calculated to assess groundwater discharge. In some cases, the upgradient wells had higher specific conductivity levels than was recorded in the surface water. In these cases, a presence of groundwater would be indicated by pore water specific conductivity measurements that are greater than that measured in surface water. Pore water specific conductivity values met the target level indicating a groundwater provenance at only 3 of the 16 pore water sampling stations (PW-2B, PW-3A, and PW-7B), although the specific conductivity measured at several other pore water stations approached the target range. However, the values recorded at many of the other stations were either greater or less than in both surface water and groundwater specific conductivities associated with the station. The ambiguity of the specific conductivity results likely in part reflects the temporal variability in surface water conductivity, which varies as a function of tidal and climatic conditions, and the spatial variability in groundwater specific conductivity.

3.2 CHLOROBENZENE

Pore water was sampled at all 16 stations located in Curtis Bay and Stonehouse Cove adjacent to the southern and western boundaries of the FMC property (Figure 2). Eleven of the stations (denoted by an "A" in the station identifier) are situated at nearshore locations within the intertidal zone where groundwater discharge is expected to be greatest. Five of these stations (PW-1A, PW-2A, PW-3A, PW-7A, and PW-10A) were positioned to be immediately downgradient of shoreline wells in which the highest historical concentrations of chlorobenzene have been detected in shoreline groundwater (wells MW-14A, MW-15A, MW-16A, MW-43A, and MW-42). A second set of five offshore pore water sampling stations (PW-1B, PW-2B, PW-3B, PW-7B, and PW-10B) was positioned approximately 75 ft from the shoreline along transects oriented perpendicular to the shoreline to assess if groundwater discharge is occurring further offshore.

The chlorobenzene analytical results for each of the pore water sampling stations are provided in Tables 2 and 3, and are shown on a plan view map in Figure 5. Chlorobenzene was detected in 10 of the 11 nearshore stations, with detected concentrations ranging from 0.33 to 670 micrograms per liter (μg/L), well below those detected in upgradient groundwater, which range from 70 to 33,100 μg/L (Figure 5). Nearshore pore water samples from stations in Curtis Bay exhibited a similar range in concentration to the samples collected from nearshore stations in Stonehouse Cove. Chlorobenzene was not detected in any of the three offshore stations in Curtis Bay (PW-1B, PW-2B, and PW-3B). Chlorobenzene was detected in pore water from offshore stations PW-7B and PW-10B in Stonehouse Cove at concentrations of 59.7 and 183μg/L, respectively; also well below those detected in upgradient groundwater. Further, the adjacent nearshore stations (PW-7A and PW-10A) exhibited considerably lower chlorobenzene concentrations (<0.22 and 1.6 μg/L, respectively). These findings suggest that the fine-grained, low-permeability sediments at the base of the cove limit nearshore groundwater discharge in localized areas of Stonehouse Cove, and that groundwater discharge occurs further offshore in these areas.

To place the pore water chlorobenzene concentrations in context, Table 4 compares the average chlorobenzene concentration in pore water to the average concentration measured in shoreline groundwater monitoring wells. On average across the entire Site shoreline, the chlorobenzene concentrations in pore water were 29 times lower than the concentrations in shoreline groundwater (Table 4). More importantly, pore water chlorobenzene concentrations were on average >29,000 times lower than chlorobenzene concentrations in groundwater in the areas where the highest chlorobenzene concentrations are present in Site shoreline groundwater. As is discussed above, five transects consisting of two pore water sampling stations each (PW-1A, PW-1B, PW-2A, PW-2B, PW-3A, PW-3B, PW-7A, PW-7B, PW-10A, and PW-10B), were positioned immediately downgradient of the shoreline wells where the highest concentrations of chlorobenzene are present in shoreline groundwater (wells MW-14A, MW-15A, MW-16A, MW-43A, and MW-42). The chlorobenzene concentrations at these pore water sampling stations were 16 to >150,000 times lower than the chlorobenzene concentrations in the shoreline groundwater wells immediately upgradient (Table 5). These results demonstrate that, while some impacted groundwater is potentially discharging from the Site to Curtis Bay and Stonehouse Cove, the groundwater recovery system is effective in capturing groundwater discharge from the Site and the system, coupled with attenuation processes along the flow path, is limiting chlorobenzene in pore water to low concentrations relative to shoreline groundwater. Further, chlorobenzene is a conservative analog for assessing the transport of other Site COCs to pore water with groundwater discharge.

4 PRELIMINARY SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

A preliminary SLERA was conducted to evaluate the potential risk posed by chlorobenzene in pore water to benthic communities, following USEPA's *Guidelines for Ecological Risk Assessment* (USEPA 1998). Though other constituents have been detected in Site groundwater, chlorobenzene is among the most mobile and is the analyte detected most frequently and at the highest concentrations. Therefore, the conclusions regarding chlorobenzene risks could be regarded as indicative of total risks for Site pore water. Potential risks associated with other groundwater COCs are discussed in Section 4.4.

4.1 PROBLEM FORMULATION

The Site is located along Stonehouse Cove and Curtis Bay, which are side embayments of the Patapsco River, a sub-estuary of the Chesapeake Bay. The watershed surrounding the Site is largely urban and industrial. Monitoring at the station WT5.1 by Maryland Department of Natural Resources (MDDNR 2012) from 1985–2012 indicates that salinity in Curtis Bay ranges from 5 to 18 parts per trillion (ppt). Surface water salinity reported at the station ranged from 0.2 to 8 ppt during the September 2011 sampling event and from 4 to 8 ppt during the May/June 2012 sampling event.

Groundwater at the Site contains chlorobenzene. The pore water data suggest that, although substantially limited by the groundwater recovery system and natural attenuation processes, some chlorobenzene in groundwater may be discharging from the Site to nearshore areas in Curtis Bay and nearshore and offshore locations in Stonehouse Cove. Benthic organisms that live on or in the sediments surrounding the Site could be exposed to chlorobenzene via respiration (gill uptake) and direct contact. Chlorobenzene does not accumulate to any significant degree in aquatic life (nor do any of the other groundwater COCs); therefore, exposures via the diet are not expected to contribute importantly to overall exposures. Exposures in water column species will be less than those in benthic species given that chlorobenzene does not bioaccumulate in the foodweb and concentrations in surface water will be reduced quickly due to volatilization and dispersion in the water column.

As a result, benthic organisms are selected as the primary receptor for this assessment. The preliminary SLERA endpoint is protection of benthic community composition and production. Given the salinity range near the Site, estuarine/marine species are the focus of the assessment.

4.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

Chlorobenzene is an organic chemical that induces toxicity via a nonpolar narcosis mode of action (Calamari et al. 1983; Verhaar et al. 1992; Roex et al. 2000; Richardson 2007). Nonpolar narcosis, also referred to as "baseline toxicity," is a nonspecific physiological effect that is independent of chemical structure and directly correlated with a chemical's hydrophobicity (Roex et al. 2000; Richardson 2007). This mode of action is applicable to neural organic chemicals. Chemicals that operate via this mode of action disrupt cellular processes by interacting with the lipids of biological membranes. This mode of action operates under acute and chronic exposure conditions and is reversible once the chemical is removed (Konemann 1981).

Based on summaries prepared by USEPA (1995), chlorobenzene has moderate to low toxicity to aquatic organisms following acute exposures, with toxicity values in the range between >1 milligrams per liter (mg/L) to 100 mg/L. USEPA (1995) reported threshold limit values for chlorobenzene in fish exposed for 24 to 96 hours to be in the range of 20–70 mg/L. Algae appear to be less sensitive, with a toxicity threshold value of >390 mg/L reported (USEPA 1995). USEPA (1995) calculated an algal 96-hour median effective concentrations (EC50[7]) of 8.9 mg/L and a daphnid 48-hour EC50 of 13.6 mg/L using the neutral organic quantitative structure activity relationship (QSAR) (Clements and Nabholz 1994).

Toxicity following chronic exposures has not been studied extensively and USEPA has not developed an aquatic water quality criterion for chlorobenzene due to insufficient data. Roex et al. (2000) examined acute and chronic toxic responses for a number of nonpolar chemicals (chlorobenzene included) and across a variety of taxa, and calculated a mean acute-to-chronic ratio (ACR) of 2.6 for these chemicals.

USEPA Region III (USEPA 2012) uses a marine screening benchmark for chlorobenzene of 25 µg/L as a screening-level benchmark to evaluate screening-level risks from chronic exposures to chlorobenzene. The Region III screening value is based on interim *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 1999) that were derived from a single growth rate reduction study on the sand crab, *Portunus pelagicus*, in which a 10% reduction in growth was observed following 40 days of exposure to chlorobenzene at a concentration of 250 µg/L. Chlorobenzene was detected in pore water at several locations at the FMC Baltimore Site above the 25 µg/L screening level.

To supplement the Region III value based on that single study, secondary chronic values (SCVs) were developed using median lethal concentration (LC50[8]) data for marine taxa published in USEPA's ECOTOX database (USEPA 2007). Following USEPA (1991) guidance, SCVs can be

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[7] EC50 = median effective concentration of toxicant that produces a designated effect in 50% of test organisms exposed

[8] LC50 = lethal effective concentration of toxicant that produces lethality in 50% of test organisms

developed using acute toxicity test data by dividing the acute value (e.g., LC50) by an ACR. SCVs were developed using two different ACRs: 1) the ACR of 2.6 derived by Roex et al. (2000) for nonpolar narcotic chemicals such as chlorobenzene, and 2) an ACR of 10 recommended by USEPA (1991) when there is an “absence of data to develop an ACR”. The ACR of 10 represents the upper 90^{th} percentile of all published ACR data (all chemicals), as reported by USEPA (1991). The ACR of 10 is used here in addition to the chemical-specific ACR or 2.6 to provide a potential range of possible toxicity values. Because chemical-specific data do exist, there is less uncertainty surrounding the ACR of 2.6.

Data from acute toxicity studies using marine species were derived from USEPA’s ECOTOX database. The compiled data are presented in Attachment A. Test data were available for studies with sheepshead minnow, opossum shrimp, and fleshy prawn. A total of eight effects concentrations from three independent studies were reported. The LC50 values ranged from 1,720 µg/L to 24,700 µg/L, with a geometric mean of all values of 11,000 µg/L. This geometric mean value is very close to the daphnid acute value of 13,600 µg/L reported by USEPA (1995), which was derived using a QSAR approach for the narcosis mode of action. Applying the ACRs of 10 and 2.6 to the geometric mean acute value results in SCVs of 1,100 and 4,200 µg/L, respectively.

4.3 SCREENING-LEVEL EXPOSURE AND RISK ESTIMATE

A hazard quotient (HQ) approach was used to support the screening level risk calculations. Risks were evaluated separately for Stonehouse Cove and Curtis Bay locations. Table 6 compares maximum and mean detected chlorobenzene concentrations to the calculated SCVs. As can be seen, the calculated HQs are below 1 even when the maximum pore water chlorobenzene concentration is compared to the SCV based on an ACR of 10. Further, the HQs based on the mean pore water concentrations are 5 to 30 times below 1. These comparisons indicate that the chlorobenzene detected in the pore water does not pose a risk to benthic organisms.

Chlorobenzene pore water concentrations are well below those detected in groundwater (on average 29 times lower than the concentrations in all shoreline groundwater and >29,000 times lower than the concentrations in shoreline wells where the greatest impacts are present; Tables 4 and 5)—demonstrating that transport of chlorobenzene to pore water with discharging groundwater is highly limited by the groundwater recovery system and natural attenuation processes and demonstrating the groundwater extraction system is effective in controlling the releases from the Site. That limited transport, coupled with the relatively low toxicity of chlorobenzene to aquatic organisms, indicates that any chlorobenzene being transported with groundwater discharge does not pose an unacceptable risk to ecological receptors.

4.4 UNCERTAINTY EVALUATION

There are several sources of uncertainty in this evaluation.

First, there is some degree of uncertainty associated with the SCV toxicity values used in this assessment. The SCVs used are more than 40 times higher than USEPA Region III screening value. If USEPA Region III values were used in the preliminary SLERA, approximately half of the sampled stations would show a HQ greater than 1. However, the Region III screening value is based on a single study. Because the toxic mode of action is relatively well understood for organic compounds such as chlorobenzene, SCVs can be derived based on laboratory data sets documenting acute responses. This approach allowed for the consideration of eight LC50s reported from three independent laboratory studies in the derivation of SCVs. The fact that a comparable SCV can be derived using a ACR of 10 or 2.6 applied to the laboratory test LC50 data or the QSAR calculated daphnid value published by USEPA (1995) (which itself is higher than the USEPA Region III screening value) lends confidence to the toxicity values used in this assessment and to the conclusions reached.

Second, there is some uncertainty regarding the degree to which the pore water measurements are representative of potential exposure concentrations in benthic organisms. The uncertainty stems from both measurement technique and potential temporal variability. However, the fact that both well points and equilibrium sampling techniques (i.e., peepers) were used, and overall found comparable results, lends confidence to the data. With regard to the temporal representativeness of the data, because the groundwater containment system is active year round, significant variation in the discharge of any groundwater that is not captured by the system is not expected.

Finally, because the pore water sampling was limited to chlorobenzene, the pore water data cannot be used to directly predict the risks of all COCs potentially associated with groundwater discharge from the Site. The primary purpose of the pore water sampling program was to determine the effectiveness of the groundwater extraction system in controlling discharge. Chlorobenzene was used as an indicator chemical to address this question given its high concentration and spatial prevalence in groundwater, and its high mobility relative to all other COCs. Comparison of the pore water chlorobenzene data to adjacent, shoreline groundwater chlorobenzene data (Tables 4 and 5) provides a means to assess the degree of dilution/attenuation that occurs as groundwater discharges from the Site. Risk posed by COCs other than chlorobenzene can be conservatively estimated based on the concentrations measured in shoreline groundwater and the degree of attenuation/dilution calculated from the chlorobenzene data.

To do this, SCVs were calculated for all other Site groundwater COCs for which toxicity data are available and compared to the average and maximum of detected COC concentrations measured in Site groundwater during the November 2008, October 2011, February 2012, and

July 2012 sampling events (Table 7). Although the SCVs are not applicable strictly to groundwater, a comparison of groundwater COC concentrations to SCVs can provide a preliminary conservative assessment to determine if groundwater discharge from the Site is likely to result in pore water COC concentrations that pose a risk to benthic organisms. The SCVs were derived using data from USEPA's ECOTOX database and methods comparable to those used to derive the SCVs for chlorobenzene. A few of the other COCs are polar narcotic compounds (compared to nonpolar chlorobenzene). In these instances, the ACR of 9.8 developed by Roex et al. (2000) was used and is essentially the same as the default USEPA ACR of 10. Attachment B presents the supporting data used for the SCV calculations.

Only ethylbenzene, 1,2,4-trichlorobenzene, 2-chlorophenol, 2-methylphenol, and 4-nitrophenol were detected in groundwater at concentrations above their respective SCVs. Ethylbenzene was detected above the SCV calculated based on a conservative ACR of 10 in only 4 of the 240 groundwater samples in which it was analyzed. All of the detections were from samples collected from well MW-28 located near the shoreline (Figure 5). In each of these samples, groundwater concentrations were elevated by no more than a factor of 2 above the conservative SCV. 1,2,4-Trichlorobenzene was detected above the SCV calculated based on the conservative ACR of 10 in only 4 of the 239 groundwater samples in which it was analyzed. All four of the detections were from samples collected from well MW-4, which is located well away from the shoreline (Figure 5). As was the case with ethylbenzene, 1,2,4-trichlorobenzene concentrations in these wells were less than a factor of 2 above the SCV. Neither ethylbenzene nor 1,2,4-trichlorobenzene were detected in groundwater at a concentration above the SCVs calculated based on an ACR of 2.6. 2-Chlorophenol, 2-methylphenol, and 4-nitrophenol were each detected above the SCVs in only 1 of 239 samples in which these chemicals were analyzed. In each instance, the measured groundwater concentration was a factor of 2 or less above the SCV derived using either the USEPA-based ACR of 10 or the narcosis-based ACR of 9.8 for polar narcotics (Roex et al. 2000).

Because the groundwater COCs have the same mode of action, hazard indices (HIs)[9] were calculated to assess the potential cumulative risk related to all site-related groundwater COCs other than chlorobenzene. HIs calculated based on shoreline groundwater data are less than 1 in all but 6 of the 77 shoreline groundwater samples, and the maximum HI was only 4 (Table 8). The pore water and groundwater data for chlorobenzene demonstrate that the combined influence of the groundwater recovery system and natural attenuation processes substantially limit the expression of groundwater COCs in pore water adjacent to the Site. The combination of these factors resulted in pore water chlorobenzene concentrations that were on average 29 times lower than the concentrations in all shoreline groundwater (Table 4) and >29,000 times lower than the concentrations in shoreline wells where the greatest impacts are present (Table 5). Given this level of dilution/attenuation and the fact that the occurrence of HIs >1 in undiluted shoreline groundwater is infrequent and limited to HIs ≤4, groundwater discharge of

[9] The sum of all chemical-specific hazard quotients with corresponding screening values.

COCs other than chlorobenzene from the Site is highly unlikely to contribute substantively to benthic risk in pore water in Curtis Bay or Stonehouse Cove.

4.5 SCIENTIFIC MANAGEMENT DECISION POINT

Following USEPA ecological risk assessment guidance, a scientific management decision point is reached at the conclusion of a SLERA. The decision point defines whether additional study beyond the SLERA is needed, including the need for a full baseline ecological risk assessment at the Site. Analysis of the data indicates that transport of COCs with groundwater discharge from the Site to pore water is substantially limited by the groundwater recovery system and natural attenuation processes, and that the limited groundwater discharge occurring at the Site does not pose an unacceptable risk to benthic organisms adjacent to the Site. This conclusion holds for chlorobenzene, which was sampled in nearshore and offshore pore water, and based on extrapolation, for the other COCs that are present in groundwater but not sampled in pore water.

Although there are some uncertainties associated with the analysis, the conditions at the Site and the low levels of COCs in groundwater relative to toxicity standards lend strength to the conclusion of the SLERA that groundwater at the Site does not pose an unacceptable risk to ecological receptors. Based on this, no additional study is needed to characterize ecological risks from groundwater discharge at the Site.

5 CONCLUSIONS AND RECOMMENDATIONS

Based on the pore water sampling performed at the Site, the concentrations of chlorobenzene in pore water are low relative to the concentrations in groundwater in shoreline wells, indicating that the combined influences of recovery system and attenuation processes along the flow path act to limit chlorobenzene concentrations in pore water to below SCVs based on risk to marine benthic organisms. The recovery system, coupled with natural attenuation, is expected to be achieving a similar, if not greater, performance level with respect to preventing the offsite migration of other Site COCs in groundwater. Given the observed level of attenuation, combined with the low concentrations of SCVs for four other COCs in groundwater, this analysis demonstrates that groundwater discharge from the Site is highly unlikely to result in COC concentrations that are above SCVs in pore water in Curtis Bay or Stonehouse Cove.

Based on these findings, no additional study is needed to characterize potential impacts of Site groundwater to pore water at the Site.

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FIGURES

Lat.: 39.2290 Lon.: -76.5766
Source: USGS Topographic Quadrangle, Curtis Bay, Maryland

Figure 1
Site Location Map
FMC Corporation
Former Agricultural Products Group Facility
Baltimore, Maryland

N

1000 0 1000 2000

Scale in Feet (Approx.)

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

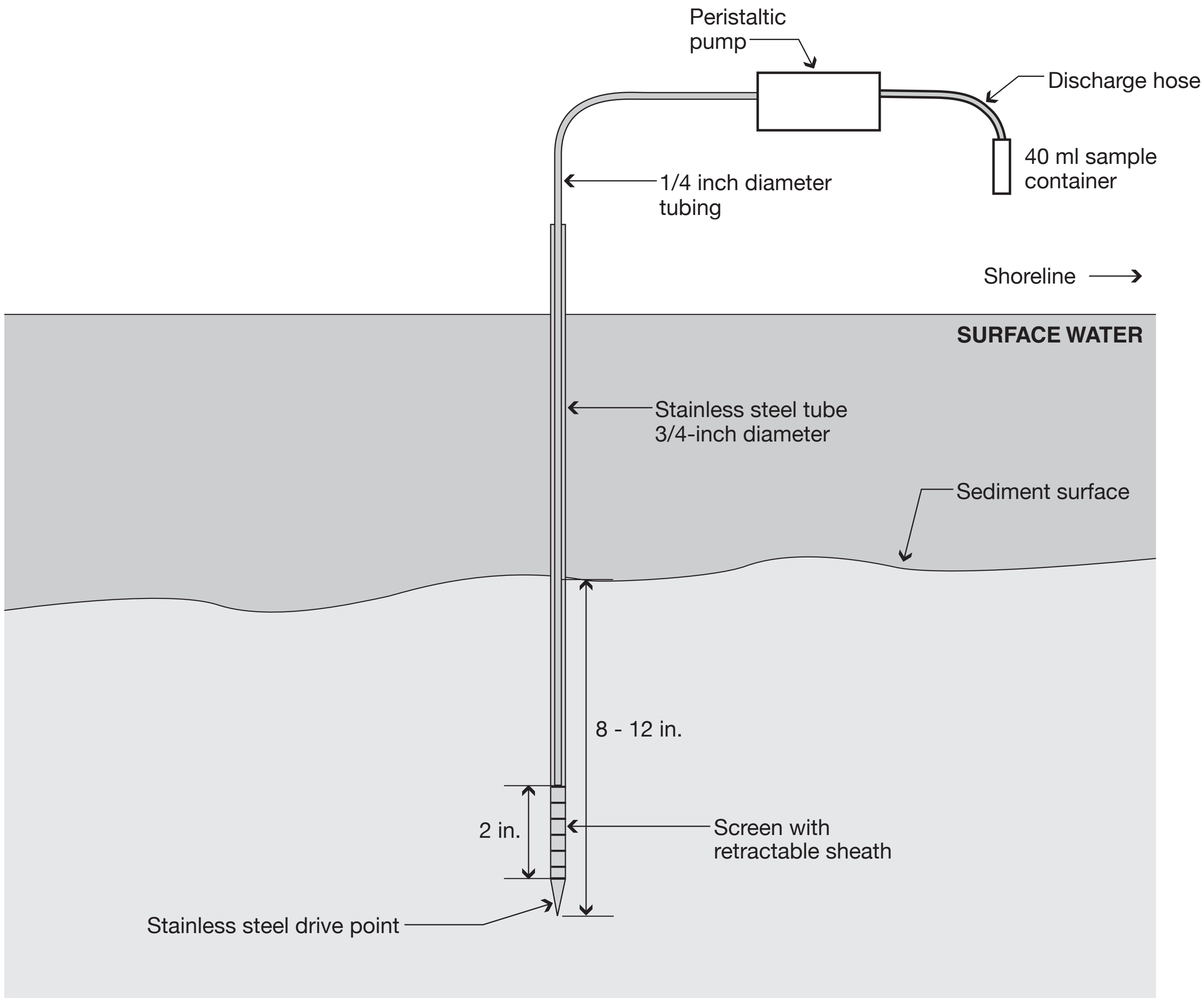
PRINCETON CROSSROADS CORPORATE CENTER
250 PHILLIPS BLVD. SUITE 280
EWING, NEW JERSEY 08618

TITLE:

FINAL PORE WATER SAMPLING STATIONS
FMC BALTIMORE, FORMER AGRICULTURAL PRODUCTS DIVISION GROUP FACILITY
BALTIMORE, MARYLAND

DWN: EMJ/SRV	DES.:	FIGURE NO.: 2
CHKD: PB	APRD:	W.O. No.: 0142390
DATE: SEPT 2012	REV.: SEPT 2012	Drawing No.: 0142390.003

Figure 3
Push Point Pore Water Sampling Point General Schematic
Former Agricultural Products Group Facility
FMC Corporation
Baltimore, Maryland



Not to Scale

ERM

Figure 4
Small Volume Peeper General Schematic
Former Agricultural Products Group Facility
FMC Corporation
Baltimore, Maryland

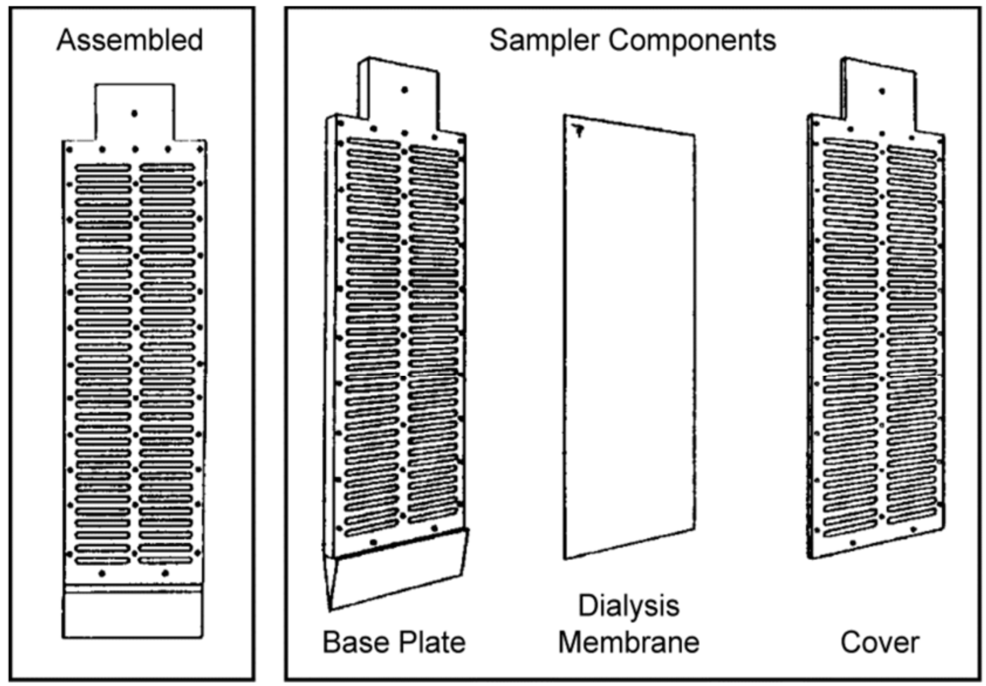
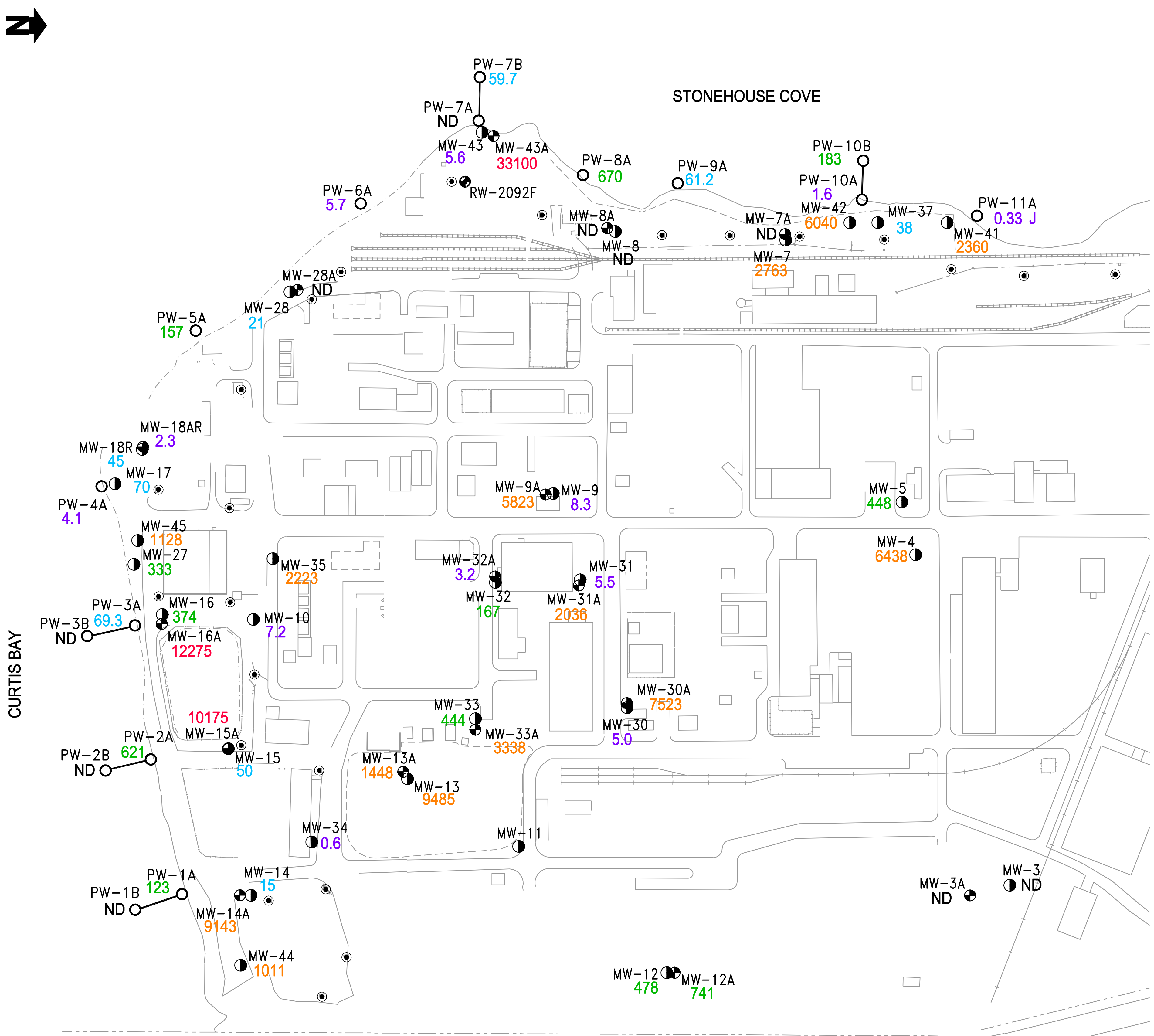


FIGURE 5
CHLOROBENZENE CONCENTRATION DISTRIBUTION
FMC BALTIMORE, FORMER AGRICULTURAL PRODUCTS GROUP FACILITY
BALTIMORE, MARYLAND



LEGEND

— - —	PROPERTY LINE
—x—	FENCE
◕	DEEP MONITORING WELL
◑	SHALLOW MONITORING WELL
⊙	RECOVERY WELL
○	PORE WATER SINGLE SAMPLING LOCATION
○—○	PORE WATER SAMPLE TRANSECT LOCATION
ND	CHLOROBENZENE CONCENTRATION ND
1	CHLOROBENZENE CONCENTRATION <10 ug/l
10	CHLOROBENZENE CONCENTRATION 10 -100 ug/l
100	CHLOROBENZENE CONCENTRATION 100 -1000 ug/l
1000	CHLOROBENZENE CONCENTRATION 1000 -10000 ug/l
10000	CHLOROBENZENE CONCENTRATION 10000 - 100000 ug/l
ND	NOT DETECTED AT THE LABORATORY DETECTION AND/OR REPORTING LIMIT
J	INDICATES AN ESTIMATED VALUE

NOTES:
1. CHLOROBENZENE CONCENTRATIONS AT MONITORING WELL LOCATIONS ARE AN AVERAGE MEASURED IN THE WELL DURING THE NOVEMBER 2008, OCTOBER 2011, FEBRUARY 2012, AND JULY 2012 MONITORING EVENTS.
2. CHLOROBENZENE CONCENTRATIONS AT PORE WATER LOCATIONS ARE RESULTS REPORTED FOR THE SEPTEMBER 2011 AND JUNE 2012 SAMPLING EVENTS.
3. RESULTS ARE REPORTED IN MICROGRAMS PER LITER (UG/L).

200 100 0 200
SCALE IN FEET

ADAPTED FROM: FMC PLANT, GROUND WATER WELLS MAP LOCATION & LEGEND,DATE 1/92. DWG ID WAS 10010, OBG 1999.

G:\CAD\Drawings\FMC_Baltimore\0142390\A202.dwg

MLB/12-13-12

ERM, INC.

TABLES

Table 1. Field Parameter Data

					Pore Water [a]			Surface Water			Ave. Site Groundwater [b]			Target Pore Water Range [c]
Station	Sampling Method	Date	Northing	Easting	Sample Depth (inch BML)	Temp (°c)	Cond (µS/cm)	Water Depth (ft)	Temp (°c)	Cond (µS/cm) Before After	Upgradient Wells	Temp (°c)	Cond (µS/cm)	Cond (µS/cm)
PW-1A	Well Point	09/16/11	568301	1432966	12	23.9	6,550	0	23.7	4,156	MW-14, MW-14A, MW-44	17.5	2,109	2,109 - 3,133
PW-1B	Well Point	09/19/11	568249	1433003	12	21.2	10,370	4.3	22.6	5,328	MW-14, MW-14A, MW-44	17.5	2,109	2,109 - 3,719
PW-2A	Well Point	09/16/11	568198	1432749	12	22.3	1,259	0	22.5	4,377	MW-15	17.4	12,345	8,361 - 12,345
											MW-15A	17.8	1,915	1,915 - 3,146
PW-2B	Well Point	09/19/11	568121	1432794	12	23.1	11,120	5	21.5	5,146	MW-15	17.4	12,345	8,746 - 12,345
											MW-15A	17.8	1,915	1,915 - 3,531
PW-3A	Well Point	09/16/11	568122	1432570	12	19.4	11,170	0	21.6	4,262	MW-16	19.4	16,317	10,290 - 16,317
											MW-16A	17.9	2,306	2,306 - 3,284
PW-3B	Well Point	09/16/11	568056	1432595	12	24.1	1,261	2.3	24	4,444	MW-16	19.4	16,317	10,381 - 16,317
											MW-16A	17.9	2,306	2,306 - 3,375
PW-4A	Well Point	09/14/11	568005	1432351	10	29.3	6,270	1.8	26.3	2,742	MW-17	16.8	1,646	1,646 - 2,194
PW-5A	Well Point	09/14/11	568138	1432012	10	22.1	4,024	2.1	26.2	3,661	MW-28	17.1	4,593	4,127 - 4,593
											MW-28A, MW18R, MW-18AR	16.2	581	581 - 2,121
PW-6A	Well Point	09/14/11	568330	1431781	10	26.5	1,030	4	25.7	3,790	MW-28	17.1	4,593	4,192 - 4,593
											MW-28A, MW-43, MW-43A	16.4	1,067	1,067 - 2,429
PW-7A	Well Point	09/14/11	568488	1431585	10	38.9	912	5	24.6	4,162	MW-43, MW-43A	16.4	1,490	1,490 - 2,826
PW-7B	Well Point	09/13/11	568474	1431518	10	27.1	2063	9.5	25.7	4,709	MW-43, MW-43A	16.4	1,490	1,490 - 3,100

Table 1. Field Parameter Data

	Pore Water [a]							Surface Water			Ave. Site Groundwater [b]			Target Pore Water Range [c]
Station	Sampling Method	Date	Northing	Easting	Sample Depth (inch BML)	Temp (°c)	Cond (µS/cm)	Water Depth (ft)	Temp (°c)	Cond (µS/cm) Before After	Upgradient Wells	Temp (°c)	Cond (µS/cm)	Cond (µS/cm)
PW-8A	Small Volume Peeper	06/19/12	568667	1431594	8 - 12	28.5	7835	2.8	25.1	11,801	MW-43, MW-43A, MW-8A	16.2	1,178	1,178 - 6,490
											MW-8	16.6	23,223	17,512 - 23,223
PW-9A	Small Volume Peeper	06/19/12	568837	1431613	8 - 12	28.1	6,556	3.2	24.9	11,738	MW-7, MW-7A, MW-8A	17.0	770	770 - 6,254
											MW-8	16.6	23,223	17,481 - 23,223
PW-10A	Small Volume Peeper	06/19/12	569155	1431549	8 - 12	26.6	9,012	2	24.8	11,788	MW-42 & MW-37	15.9	1,060	1,060 - 6,424
PW-10B	Small Volume Peeper	06/19/12	569136	1431504	8 - 12	26.7	10,210	4.3	24.6	11,487	MW-42 & MW-37	15.9	1,060	1,060 - 6,274
PW-11A	Small Volume Peeper	06/19/12	569328	1431526	8 - 11	33.1	13,230	2	24.5	11,616	MW-41	18.1	6,512	6,512 - 9,064
											MW-37 & MW-42	15.9	1,063	1,063 - 6,340

Notes:

BML = below mud line
Cond = specific conductivity
Temp = temperature
µS/cm = microsiemens per centimeter

[a] Pore water temperature and specific conductivity measurements for stations sampled by well points are based on final measurement at the end of purging.

[b] Groundwater values are calculated mean values from the November 2008, October 2011, and February/March 2012 recorded data for the nearest, upgradient groundwater monitoring well(s). Wells with similar values were averaged. Separate pore water target ranges calculated when adjacent wells exhibited substantively different field parameter values.

[c] Average site ground water values were calculated from wells closest to the pore water sampling locations. Shaded values indicate that the measured pore water specific conductivity was within the target range, indicating a provenance of groundwater.

Table 2. Pore Water Analytical Results - September 2011

Station:	PW-01A	PW-01B	PW-02A	PW-02B	PW-03A	PW-03A (DUP	PW-03B	PW-04A	PW-05A	PW-06A	PW-07A	PW-07B	Trip Blank	Rinsate Blank	Trip Blank	Rinsate Blank	Trip Blank	Trip Blank
Date Sampled:	9/16/2011	9/19/2011	9/16/2011	9/19/2011	9/16/2011	9/16/2011	9/16/2011	9/14/2011	9/13/2011	9/13/2011	9/13/2011	9/13/2011	9/14/2011	9/14/2011	9/15/2011	9/15/2011	9/16/2011	9/19/2011
Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Chlorobenzene	123	ND (0.22)	621	ND (0.22)	69.3	81	ND (0.22)	4.1	157	5.7	ND (0.22)	59.7	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)

Notes:
DUP = blind duplicate
ND = not detected at the laboratory detection limit shown in parentheses
µg/L = micrograms/liter (same as parts per billion [ppb])

Table 3. Pore Water Analytical Results - June 2012

Station:	PW-08A	PW-08A (DUP)	PW-09A	PW-10A	PW-10B	PW-11A	Rinsate Blank	Trip Blank
Date Sampled:	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012	6/19/2012
Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Chlorobenzene	670	584	61.2	1.6	183	0.33 *J*	ND (0.23)	ND (0.23)

Notes:
DUP = blind duplicate
J = indicates an estimated value
ND = not detected at the laboratory detection limit shown in parentheses
µg/L = micrograms/liter (same as parts per billion [ppb])

Table 4. Ratio of the Average Chlorobenzene Concentration in Pore Water to the Average Concentration in Shoreline Groundwater Monitoring Wells

Pore Water Chlorobenzene Concentration (µg/L)		Groundwater Chlorobenzene Concentration (µg/L)		Ratio of Groundwater to Pore Water Chlorobenzene Concentration
Average of All Stations	120	Average of All Shoreline Wells[a]	3,433	29
Average of Curtis Bay Stations[b]	110	Average of Wells Along Curtis Bay Shoreline[c]	2,885	26
Average of Stonehouse Cove Stations[d]	133	Average of Wells Along Stonehouse Cove Shoreline[e]	4,031	30

Notes:

[a] Includes wells MW-14, MW-14A, MW-44, MW-16, MW-16A, MW-45, MW-27, MW-17, MW-18R, MW-18AR, MW-28, MW-28A, MW-43, MW-43A, MW-7, MW-7A, MW-8, MW-8A, MW-42, MW-37, and MW-41

[b] Includes pore water stations PW-1A, PW-1B, PW-2A, PW-2B, PW-3A, PW-3B, PW-4A, PW-5A, and PW-6A

[c] Includes wells MW-14, MW-14A, MW-44, MW-16, MW-16A, MW-45, MW-27, MW-17, MW-18R, MW-18AR, MW-28, and MW-28A

[d] Includes pore water stations PW-7A, PW-7B, PW-8A, PW-9A, PW-10A, PW-10B, and PW-11A

[e] Includes wells MW-43, MW-43A, MW-7, MW-7A, MW-8, MW-8A, MW-42, MW-37, and MW-41

Table 5. Comparison of Chlorobenzene Concentrations in Pore Water to Chlorobenzene Concentrations in Immediately Upgradient Groundwater at the Locations of the Pore Water Transect Stations that are Positioned Offshore of Shoreline Wells with the Highest Historic Chlorobenzene Concentrations

Pore Water			Upgradient Nearshore Groundwater		
Station[a]	Chlorobenzene Concentration (µg/L)	Location	Shoreline Wells Located Immediately Upgradient	Chlorobenzene Concentration (µg/L)[b]	Ratio of Groundwater to Pore water Concentration
PW-1A	123	Curtis Bay	MW-14A	9,143	74
PW-1B	0.22 *U*	Curtis Bay	MW-14A	9,143	41,557
PW-2A	621	Curtis Bay	MW-15A	10,175	16
PW-2B	0.22 *U*	Curtis Bay	MW-15A	10,175	46,250
PW-3A	75.2 [c]	Curtis Bay	MW-16A	12,275	163
PW-3B	0.22 *U*	Curtis Bay	MW-16A	12,275	55,795
PW-7A	0.22 *U*	Stonehouse Cove	MW-43A	33,100	150,455
PW-7B	59.7	Stonehouse Cove	MW-43A	33,100	554
PW-10A	1.6	Stonehouse Cove	MW-42	6,040	3,775
PW-10B	183	Stonehouse Cove	MW-42	6,040	33
				Average	29,867

Notes:
U = Chlorobenzene below the laboratory detection limit
µg/L = micrograms/liter (same as parts per billion [ppb])

[a] Includes the sampling stations in the five, 2-station transects positioned immeidately downgradient of shoreline monitoring wells that have historically exhibited the highest chlorobenzene concentrations in groundwater

[b] The average concentration measured in the well during the November 2008, October 2011, February 2012, and July 2012 monitoring events

[c] Average of duplicate samples

Table 6. Summary of Hazard Quotients for Maximum and Average Chlorobenzene Concentrations in Pore Water across Curtis Bay and Stonehouse Cove

	Chlorobenzene Concentration (µg/L)				Hazard Quotient			
Shoreline Area[a]	Max Concentration	Mean Concentration	SCV[b] USEPA	SCV[c] Roex	Max[b]	Max[c]	Mean[b]	Mean[c]
Curtis Bay	621	106	1,100	4,200	0.6	0.1	0.1	0.03
Stonehouse Cove	670	195	1,100	4,200	0.6	0.2	0.2	0.05

Sources:
Roex et al. (2000)
USEPA (1991)

Notes:
Max = maximum
SCV = secondary chronic value
µg/L = micrograms per liter (parts per billion)

[a] Curtis Bay results across pore water sampling locations 1-6 (Sept. 2011).
Stonehouse Cove results across pore water sampling locations 7-11 (Sept. 2011 - location 7, June 2012 - locations 8-11).

[b] Hazard quotient calculations for the USEPA-based SCV using an acute-to-chronic ratio of 10 (USEPA 1991).

[c] Hazard quotient calculations for the narcosis non-polar-based SCV using an acute-chronic ratio of 2.6 (Roex et al. 2000).

Table 7. Comparison of Chemical Concentrations in Site Groundwater to Secondary Chronic Values For Marine Benthic Invertebrates

Parameter	SCV (µg/L) (Roex et al. 2000)[a]	SCV (µg/L) (USEPA 1991)[b]	Groundwater Concentration (µg/L)[c]		Number of Samples	Percentage of Detects	Percentage Greater Than SCV
			Average	Maximum			
Benzene	19243	5003	134	1300	240	52.1%	0.0%
Bromoform	9791	2546	ND	ND	240	0.0%	0.0%
Chloroethane	NA	NA	9	46	240	8.3%	NA
Chloroform	NA	NA	13	160	240	30.4%	NA
cis-1,3-Dichloropropene	NA	NA	10	10	240	0.4%	NA
Ethylbenzene	4760	1238	146	**2600**	240	38.8%	1.7%
Methylene chloride	64101	16666	11	170	240	8.8%	0.0%
trans-1,3-Dichloropropene	NA	NA	3	3	240	0.4%	NA
Trichlorofluoromethane	NA	NA	3	6	240	0.8%	NA
1,2,4-Trichlorobenzene	420	109	30	**203**	239	18.0%	1.7%
1,2-Dichlorobenzene	4546	1182	68	853	240	30.8%	0.0%
1,3-Dichlorobenzene	1115	290	4	20	239	10.0%	0.0%
1,4-Dichlorobenzene	12354	3212	222	2500	240	43.3%	0.0%
2,4,6-Trichlorophenol	315	309	1	1	235	0.4%	0.0%
2,4-Dinitrophenol	2955	2896	ND	ND	239	0.0%	0.0%
2-Chlorophenol	541	530	36	**610**	239	10.0%	0.4%
2-Methylphenol	1312	1286	170	**2670**	239	7.1%	0.4%
2-Nitrophenol	565	554	305	**1200**	239	2.9%	0.4%
4-Chloro-3-methylphenol	NA	NA	ND	ND	239	0.0%	NA
Aniline	NA	NA	5642	69000	238	8.0%	NA
bis(2-Chloroethoxy)methane	NA	NA	37	99	239	1.7%	NA
bis(2-Chloroisopropyl)ether	NA	NA	ND	ND	181	0.0%	NA
bis(2-Ethylhexyl)phthalate	NA	NA	6	11	239	0.8%	NA
Butylbenzylphthalate	NA	NA	ND	ND	239	0.0%	NA
Chrysene	666	173	2	7	239	2.1%	0.0%
Diethylphthalate	NA	NA	3	12	239	4.2%	NA
Di-n-butylphthalate	NA	NA	4	7	239	0.8%	NA
Pentachlorophenol	83	81	15	35	239	2.1%	0.0%
Phenol	8571	8400	373	1800	239	4.2%	0.0%

Sources:
Roex et al. (2000)
USEPA (1991)

Notes:
Bold values indicate that the concentration exceeds the minimum SCV

NA = data not available to calculate a SCV
ND = chemical was not detected above analytical detection limits in groundwater
SCV = secondary chronic value calculated based on LC50 data published in ECOTOX for marine benthic invertebrates
µg/L = microgram per liter
$\mu g/L^3$ = microgram per cubic liter

[a]Calculated from acute-chronic ratios (ACRs) provided by Roex et al. (2000). An ACR of 9.8 was used for polar narcosis effects, while an ACR of 2.6 was used for non-polar narcosis effects.
[b]Derived from USEPA's water quality technical guidance (USEPA 1991) using the suggested ACR of 10.
[c]Average and maximum of detected concentrations in Site groundwater samples collected from the Site during the November 2008, October 2011, February 2012, and July 2012 sampling events.

Table 8. Hazard Index Summary for Groundwater Chemicals of Concern[a] Compared with Screening Values[b] Developed using USEPA 1991 Methodology

Total Samples	Min HI	Max HI	Average HI	# HIs > 1
77	0.00007	4	0.4	6

Notes:

HI = hazard index

[a] Chlorobenzene excluded from analysis along with interior monitoring wells not representative of potential groundwater discharge from the Site.

[b] Screening values are conservative secondary chronic values adapted from USEPA's 1991 ambient water quality guidelines.

APPENDIX A

ECOTOX OUTPUT OF MARINE ACUTE TOXICITY DATA FOR CHLOROBENZENE (USEPA 2007)

ECOTOX Output of Marine Acute Toxicity Data for Chlorobenzene (USEPA 2007)

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Exposure Type	Chemical Analysis	Media Type	Test Location	Observed Duration Mean (Days)	Observed Duration Units (Days)	Endpoint	Conc 1 Mean (µg/L)	Conc 1 Units (µg/L)	Author	Title	Source	Publication Year
108907	Chlorobenzene	Americamysis bahia	Opossum Shrimp	Crustaceans	NR	U	SW	LAB	1	d	LC50	24,700	µg/L	Syracuse Research Corp.	Results of Continuous Exposure of Fathead Minnow Embryo to 21 Priority Pollutants	EPA/OTS Doc.#40-7848049:46 p.	2000
108907	Chlorobenzene	Americamysis bahia	Opossum Shrimp	Crustaceans	NR	U	SW	LAB	4	d	LC50	16,400	µg/L	Syracuse Research Corp.	Results of Continuous Exposure of Fathead Minnow Embryo to 21 Priority Pollutants	EPA/OTS Doc.#40-7848049:46 p.	2000
108907	Chlorobenzene	Penaeus chinensis	Fleshy Prawn	Crustaceans	NR	U	NR	LAB	4	d	LC50	1,720	µg/L	Yin,H., and J. Lu	Toxic Effect of Two Organic Toxicants on Penaeus chinensis	Mar. Sci.1:59-62	1993
108907	Chlorobenzene	Cyprinodon variegatus	Sheepshead Minnow	Fish	S	U	SW	LAB	1	d	LC50	20,000	µg/L	Heitmuller,P.T., T.A. Hollister, and P.R. Parrish	Acute Toxicity of 54 Industrial Chemicals to Sheepshead Minnows (Cyprinodon variegatus)	Bull. Environ. Contam. Toxicol.27(5): 596-604	1981
108907	Chlorobenzene	Cyprinodon variegatus	Sheepshead Minnow	Fish	S	U	SW	LAB	2	d	LC50	8,900	µg/L	Heitmuller,P.T., T.A. Hollister, and P.R. Parrish	Acute Toxicity of 54 Industrial Chemicals to Sheepshead Minnows (Cyprinodon variegatus)	Bull. Environ. Contam. Toxicol.27(5): 596-604	1981
108907	Chlorobenzene	Cyprinodon variegatus	Sheepshead Minnow	Fish	S	U	SW	LAB	4	d	LC50	10,000	µg/L	Heitmuller,P.T., T.A. Hollister, and P.R. Parrish	Acute Toxicity of 54 Industrial Chemicals to Sheepshead Minnows (Cyprinodon variegatus)	Bull. Environ. Contam. Toxicol.27(5): 596-604	1981
108907	Chlorobenzene	Cyprinodon variegatus	Sheepshead Minnow	Fish	S	U	SW	LAB	4	d	LC50	10,500	µg/L	Syracuse Research Corp.	Results of Continuous Exposure of Fathead Minnow Embryo to 21 Priority Pollutants	EPA/OTS Doc.#40-7848049:46 p.	2000
108907	Chlorobenzene	Americamysis bahia	Opossum Shrimp	Crustaceans	NR	U	SW	LAB	4	d	LC50	16,400	µg/L	Yin,H., and J. Lu	Toxic Effect of Two Organic Toxicants on Penaeus chinensis	Mar. Sci.1:59-62	1993

APPENDIX B

ECOTOX OUTPUT OF MARINE ACUTE TOXICITY DATA FOR GROUNDWATER CHEMICALS OF CONCERN (USEPA 2007)

ECOTOX Output of Marine Acute Toxicity Data for Groundwater Chemicals of Concern (USEPA 2007)*
*Chlorobenzene data presented in Appendix A

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Endpoint	Exposure Duration (Days)	Duration Units (Days)	Exposure Type	Chemical Analysis	Concentration	Conc Units (µg/L)	Media Type	Test Location	Reference Number	Author	Title	Source	Publication Year
51285	2,4-Dinitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	0.5	d	NR	U	24,000	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	46,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	61,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	54,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	64,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	66,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	68,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	69,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	70,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	75,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	77,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	54,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	54,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	3,400	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
51285	2,4-Dinitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	3,400	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	21,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994

ECOTOX Output of Marine Acute Toxicity Data for Groundwater Chemicals of Concern (USEPA 2007)*
*Chlorobenzene data presented in Appendix A

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Endpoint	Exposure Duration (Days)	Duration Units (Days)	Exposure Type	Chemical Analysis	Concentration	Conc Units (µg/L)	Media Type	Test Location	Reference Number	Author	Title	Source	Publication Year
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1	d	S	M	26,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	1.125	d	S	M	20,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	37,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	48,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	45,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	45,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	45,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	44,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	38,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	60,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	36,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	63,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	20,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	2	d	NR	U	200	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	30,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	2	d	S	M	34,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994

ECOTOX Output of Marine Acute Toxicity Data for Groundwater Chemicals of Concern (USEPA 2007)*
*Chlorobenzene data presented in Appendix A

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Endpoint	Exposure Duration (Days)	Duration Units (Days)	Exposure Type	Chemical Analysis	Concentration	Conc Units (µg/L)	Media Type	Test Location	Reference Number	Author	Title	Source	Publication Year
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	41,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	36,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	38,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	35,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	57,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	24,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	24,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	25,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	31,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	33,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	33,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	28,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	28,000	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	27,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	3	d	S	M	27,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	48,500	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978

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51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	36,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	49,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	21,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	23,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	26,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	31,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	31,300	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	26,700	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Palaemonetes sp.	Grass shrimp,freshwater prawn	Crustaceans	LC50	4	d	S	M	26,600	µg/L	SW	LAB	13273	Brecken-Folse, J.A., F.L. Mayer, L.E. Pedigo, and L.L. Marking	Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp (Palaemonetes spp.) and Sheepshead Minnows (Cyprinodon variegatus) as Affected by	Environ.Toxicol.Chem. 13(1):67-77	1994
51285	2,4-Dinitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	7	d	NR	U	100	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
62533	Benzenamine	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	4	d	R	M	29,400	µg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
67663	Trichloromethane	Brachionus plicatilis	Rotifer	Invertebrates	LC50	0.041666667	d	S	NR	2,400	µg/L	SW	LAB	16539	Snell, T.W., B.D. Moffat, C. Janssen, and G. Persoone	Acute Toxicity Tests Using Rotifers. III. Effects of Temperature, Strain, and Exposure Time on the Sensitivity of Brachionus plicatilis	Environ.Toxicol.Water Qual. 6:63-75	1991
67663	Trichloromethane	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	1	d	S	U	134,000	µg/L	SW	LAB	2644	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Chloroform to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	U.S.EPA, Criteria Branch, WA-6-99-1414-B, Washington, D.C. :13 p.	1979
67663	Trichloromethane	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	2	d	S	U	81,500	µg/L	SW	LAB	2644	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Chloroform to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	U.S.EPA, Criteria Branch, WA-6-99-1414-B, Washington, D.C. :13 p.	1979
67663	Trichloromethane	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	4	d	S	U	81,500	µg/L	SW	LAB	2644	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Chloroform to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	U.S.EPA, Criteria Branch, WA-6-99-1414-B, Washington, D.C. :13 p.	1979
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	43,500	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978

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71432	Benzene	Artemia salina	Brine shrimp	Crustaceans	LC50*	1	d	S	U	66,000	µg/L	SW	LAB	2408	Price, K.S., G.T. Waggy, and R.A. Conway	Brine Shrimp Bioassay and Seawater BOD of Petrochemicals	J.Water Pollut.Control Fed. 46(1):63-77	1974
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	74,400	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	1	d	S	U	82,000	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	90,800	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	1	d	S	U	111,500	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Katelysia opima	Marine bivalve	Molluscs	LC50	1	d	S	U	225,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	38,000	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	43,500	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	40,800	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Brachionus plicatilis	Rotifer	Invertebrates	LC50	1	d	S	U	1,000	µg/L	SW	LAB	6002	Ferrando, M.D., and E. Andreu-Moliner	Acute Toxicity of Toluene, Hexane, Xylene, and Benzene to the Rotifers Brachionus calyciflorus and Brachionus plicatilis	Bull.Environ.Contam. Toxicol. 49(2):266-271	1992
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	33,500	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	40,200	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
71432	Benzene	Crangon franciscorum	Bay shrimp	Crustaceans	LC50	1	d	S	M	22,000	µg/L	SW	LAB	558	Benville, P.E.Jr., and S. Korn	The Acute Toxicity of Six Monocyclic Aromatic Crude Oil Components to Striped Bass (Morone saxatilis) and Bay Shrimp (Crago franciscorum)	Calif.Fish Game 63(4):204-209	1977
71432	Benzene	Crassostrea gigas	Pacific oyster	Molluscs	LC50*	2	d	S	U		µg/L	SW	LAB	8621	Legore, R.S.	The Effect of Alaskan Crude Oil and Selected Hydrocarbon Compounds on Embryonic Development of the Pacfic Oyster, Crassostrea gigas	Washington, Seattle, WA:189 p.(1974) /Diss.Abstr.Int.B Sci.Eng. 35(7):3168	1975
71432	Benzene	Katelysia opima	Marine bivalve	Molluscs	LC50	2	d	S	U	205,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
71432	Benzene	Cancer magister	Dungeness or edible crab	Crustaceans	LC50	2	d	S	M	347,000	µg/L	SW	LAB	5035	Caldwell, R.S., E.M. Caldarone, and M.H. Mallon	of Cook Inlet Crude Oil and Its Major Aromatic Components on Larval Stages of the Dungeness Crab, Cancer magister Dana	Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems	1977

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71432	Benzene	Artemia salina	Brine shrimp	Crustaceans	LC50*	2	d	S	U	21,000	µg/L	SW	LAB	2408	Price, K.S., G.T. Waggy, and R.A. Conway	Brine Shrimp Bioassay and Seawater BOD of Petrochemicals	J.Water Pollut.Control Fed. 46(1):63-77	1974
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50*	2	d	NR	U	33,000	µg/L	SW	LAB	9002	Tatem, H.E., and J.W. Anderson	The Toxicity of Four Oils to Palaemonetes pugio (Holthuis) in Relation to Uptake and Retention of Specific Petroleum Hydrocarbons	Am.Zool. 13(4):1307-1308	1973
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	U	35,000	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	U	35,000	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978
71432	Benzene	Katelysia opima	Marine bivalve	Molluscs	LC50	3	d	S	U	195,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
71432	Benzene	Katelysia opima	Marine bivalve	Molluscs	LC50	4	d	S	U	190,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
71432	Benzene	Cancer magister	Dungeness or edible crab	Crustaceans	LC50	4	d	S	M	108,000	µg/L	SW	LAB	5035	Caldwell, R.S., E.M. Caldarone, and M.H. Mallon	of Cook Inlet Crude Oil and Its Major Aromatic Components on Larval Stages of the Dungeness Crab, Cancer magister Dana	Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems	1977
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	U	27,000	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
71432	Benzene	Crangon franciscorum	Bay shrimp	Crustaceans	LC50	4	d	S	M	20,000	µg/L	SW	LAB	558	Benville, P.E.Jr., and S. Korn	The Acute Toxicity of Six Monocyclic Aromatic Crude Oil Components to Striped Bass (Morone saxatilis) and Bay Shrimp (Crago franciscorum)	Calif.Fish Game 63(4):204-209	1977
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	NR	U	27,000	µg/L	SW	LAB	45270	Neff, J.M., J.W. Anderson, B.A. Cox, R.B. Laughlin Jr., S.S. Rossi, and H.E. Tatem	Effects of Petroleum on Survival, Respiration and Growth of Marine Animals	Am.Inst.Biol.Sci. :516-539	1976
71432	Benzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	U	27,000	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978
75092	Methylene chloride	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	M	108,500	µg/L	SW	LAB	3163	Burton, D.T., and D.J. Fisher	Zinc, Ammonia, 3,3'-Dichlorobenzidine, 2,6-Dichloro-4-Nitroaniline, Methylene Chloride, and 2,4,6-Trichlorophenol to Juvenile Grass Shrimp and Killifish	Bull.Environ.Contam. Toxicol. 44(5):776-783	1990
75092	Methylene chloride	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	256,000	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
75252	Bromoform	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	24,400	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
75252	Bromoform	Penaeus aztecus	Brown shrimp	Crustaceans	LC50	4	d	F	M	26,000	µg/L	SW	LAB	5880	Anderson, D.R., R.M. Bean, and C.I. Gibson	Biocide By-Products in Aquatic Environments	Report Covering Period October 1 Through December 31, 1978:41	1979
75252	Bromoform	Penaeus aztecus	Brown shrimp	Crustaceans	LC50	4	d	F	M	26,000	µg/L	SW	LAB	6336	Gibson, C.I., F.C. Tone, P. Wilkinson, J.W. Blaylock, and R.E. Schirmer	Toxicity, Bioaccumulation and Depuration of Bromoform in Five Marine Species	Pacific Northwest Lab., Richland, WA:40 p.(U.S.NTIS NUREG/CR-1297)	1981

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84662	1,2-Benzenedicarboxylic acid, Diethyl ester	Acartia tonsa	Calanoid copepod	Crustaceans	LC50	2	d	S	U	9,000	µg/L	SW	LAB	66691	Andersen, H.R., L. Wollenberger, B. Halling-Sorensen, and K.O. Kusk	Development of Copepod Nauplii to Copepodites - a Parameter for Chronic Toxicity Including Endocrine Disruption	Environ.Toxicol.Chem. 20(12):2821-2829	2001
84662	1,2-Benzenedicarboxylic acid, Diethyl ester	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	74,000	µg/L	SW	LAB	10905	Bengtsson, B.E., and M. Tarkpea	The Acute Aquatic Toxicity of Some Substances Carried by Ships	Mar.Pollut.Bull. 14(6):213-214	1983
84662	1,2-Benzenedicarboxylic acid, Diethyl ester	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	7,590	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
84742	1,2-Benzenedicarboxylic acid, Dibutyl ester	Laevicardium mortoni	Morton's egg cockle	Molluscs	LC50	4	d	F	M	1,100	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
84742	1,2-Benzenedicarboxylic acid, Dibutyl ester	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	1,700	µg/L	SW	LAB	5185	Linden, E., B.E. Bengtsson, O. Svanberg, and G. Sundstrom	and Pesticide Formulations Against Two Brackish Water Organisms, the Bleak (Alburnus alburnus) and the Harpacticoid Nitocra spinipes	8(11/12):843-851 (Author Communication Used) (OECDG Data	1979
84742	1,2-Benzenedicarboxylic acid, Dibutyl ester	Leptosynapta inhaerens	Sea cucumber	Invertebrates	LC50	4	d	F	M	2,900	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
84742	1,2-Benzenedicarboxylic acid, Dibutyl ester	Armandia maculata	Polychaete or Opheliid worm	Worms	LC50	4	d	F	M	2,900	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
84742	1,2-Benzenedicarboxylic acid, Dibutyl ester	Corophium acherusicum	Scud	Crustaceans	LC50	4	d	F	M	450	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
85687	1,2-Benzenedicarboxylic acid, Butyl phenylmethyl ester	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	S	U	900	µg/L	SW	LAB	15239	Kaley, W.J. Adams, O. Hicks, P.R. Michael, V.W. Saeger, and G.A. LeBlanc	An Environmental Safety Assessment of Butyl Benzyl Phthalate	Environ.Sci.Technol. 14(3):301-305	1980
85687	1,2-Benzenedicarboxylic acid, Butyl phenylmethyl ester	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	9,630	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
87865	Pentachlorophenol	Haliotis rufescens	Red abalone	Molluscs	LC50	0.25	d	F	U	1,600	µg/L	SW	LAB	3798	Tjeerdema, R.S., T.W.M. Fan, R.M. Higashi, and D.G. Crosby	Sublethal Effects of Pentachlorophenol in the Abalone (Haliotis rufescens) as Measured by In Vivo 31P NMR Spectroscopy	J.Biochem.Toxicol. 6(1):45-56	1991
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	0.5	d	NR	U	12,100	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	1	d	R	M	1,500	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	3,920	µg/L	SW	LAB	17289	D. Rossel, J. Tarradellas, H. Meyer, H. Saiah, P. Vogel, C. Delisle, and C. Blaise	Cyst-Based Ecotoxicological Tests Using Anostracans: Comparison of Two Species of Streptocephalus	Environ.Toxicol.Water Qual. 9(4):317-326	1994
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	3,600	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	3,600	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996

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87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	1	d	R	M	2,400	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	1,600	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	1,600	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	1,081	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	1	d	S	U	8,200	µg/L	SW	LAB	15051	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Pentachlorophenol to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	WA-6-99-1414-B, U.S.EPA, Washington, D.C. :13 p.	1975
87865	Pentachlorophenol	Gammarus duebeni	Scud	Crustaceans	LC50	1	d	R	U	723	µg/L	SW	LAB	18971	Lawrence, A.J., and C. Poulter	Development of a Sub-lethal Pollution Bioassay Using the Estuarine Amphipod Gammarus duebeni	Water Res. 32(3):569-578	1998
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	689	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	718	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	1	d	R	U	541	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Ampelisca araucana	Gammarid amphipod	Crustaceans	LC50	2	d	NR	U	90	µg/L	SW	LAB	54390	Soto, E., A. Larrain, and E. Bay-Schmith	Sensitivity of Ampelisca araucana Juveniles (Crustacea: Amphipoda) to Organic and Inorganic Toxicants in Tests of Acute Toxicity	Bull.Environ.Contam. Toxicol. 64(4):574-578	2000
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	2	d	R	M	1,500	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	2	d	NR	M	1,400	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Crepidula fornicata	Slipper limpet	Molluscs	LC50	2	d	NR	M	1,200	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	2	d	R	U	1,131	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	2	d	R	M	1,100	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	2	d	NR	M	1,100	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981

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87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	2	d	NR	M	20,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	2	d	S	U	7,400	µg/L	SW	LAB	15051	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Pentachlorophenol to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	WA-6-99-1414-B, U.S.EPA, Washington, D.C. :13 p.	1975
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	2	d	NR	M	5,800	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Gammarus duebeni	Scud	Crustaceans	LC50	2	d	R	U	363	µg/L	SW	LAB	18971	Lawrence, A.J., and C. Poulter	Development of a Sub-lethal Pollution Bioassay Using the Estuarine Amphipod Gammarus duebeni	Water Res. 32(3):569-578	1998
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	2	d	NR	U	300	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
87865	Pentachlorophenol	Temora longicornis	Calanoid copepod	Crustaceans	LC50	2	d	NR	M	200	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	2	d	R	U	568	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	2	d	NR	M	580	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	2	d	NR	M	600	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	2.75	d	R	M	3,300	µg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
87865	Pentachlorophenol	Molgula sp.	Sea-squirt, Sea grapes	Miscellaneous	LC50	3	d	F	M	46	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	3	d	R	U	1,049	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	3	d	R	M	1,200	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	3	d	R	M	900	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	3	d	R	U	472	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Corophium acherusicum	Scud	Crustaceans	LC50	4	d	F	M	82	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987

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87865	Pentachlorophenol	Laevicardium mortoni	Morton's egg cockle	Molluscs	LC50	4	d	F	M	163	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	F	U	150	µg/L	SW	LAB	2332	Bengtsson, B.E., and B. Bergstrom	A Flowthrough Fecundity Test with Nitocra spinipes (Harpacticoidea Crustacea) for Aquatic Toxicity	Ecotoxicol.Environ.Saf. 14:260-268	1987
87865	Pentachlorophenol	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	F	U	70	µg/L	SW	LAB	2332	Bengtsson, B.E., and B. Bergstrom	A Flowthrough Fecundity Test with Nitocra spinipes (Harpacticoidea Crustacea) for Aquatic Toxicity	Ecotoxicol.Environ.Saf. 14:260-268	1987
87865	Pentachlorophenol	Heteromastus filiformis	Capitellid thread worm	Worms	LC50	4	d	F	M	67	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Limnodriloides verrucosus	Oligochaete	Worms	LC50	4	d	R	U	50	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Leptosynapta inhaerens	Sea cucumber	Invertebrates	LC50	4	d	F	M	37	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	R	U	2,500	µg/L	SW	LAB	4894	Rao, K.R., F.R. Fox, P.J. Conklin, and A.C. Cantelmo	Comparative Toxicology and Pharmacology of Chlorophenols: Studies on the Grass Shrimp, Palaemonetes pugio	A.Calabrese, F.P.Thurberg, and W.B.Vernberg (Eds.), Biological Monitoring	1981
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	4	d	NR	M	4,600	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	4	d	R	M	1,200	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	4	d	NR	M	1,200	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Temora longicornis	Calanoid copepod	Crustaceans	LC50	4	d	NR	M	170	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Monopylephorus cuticulatus	Tubificid	Worms	LC50	4	d	R	U	550	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Monopylephorus cuticulatus	Tubificid	Worms	LC50	4	d	R	U	395	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Monopylephorus cuticulatus	Tubificid	Worms	LC50	4	d	R	U	1,750	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Quistadrilus multisetosus	Oligochaete	Worms	LC50	4	d	R	U	450	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Mytilus edulis	Common bay mussel,blue mussel	Molluscs	LC50	4	d	NR	M	18,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981

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87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	4	d	NR	M	16,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Crangon crangon	Common shrimp, sand shrimp	Crustaceans	LC50	4	d	NR	M	10,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Monopylephorus cuticulatus	Tubificid	Worms	LC50	4	d	R	U	450	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Palaemonetes varians	Grass or Atlantic ditch shrimp	Crustaceans	LC50	4	d	NR	M	7,500	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	4	d	S	U	5,600	µg/L	SW	LAB	15051	Bentley, R.E., T. Heitmuller, B.H. Sleight III, and P.R. Parrish	Acute Toxicity of Pentachlorophenol to Bluegill (Lepomis macrochirus), Rainbow Trout (Salmo gairdneri), and Pink Shrimp (Penaeus duorarum)	WA-6-99-1414-B, U.S.EPA, Washington, D.C. :13 p.	1975
87865	Pentachlorophenol	Penaeus duorarum	Northern pink shrimp	Crustaceans	LC50	4	d	S	NR	5,600	µg/L	SW	LAB	344	Office of Pesticide Programs	Pesticide Ecotoxicity Database (Formerly: Environmental Effects Database (EEDB))	Environmental Fate and Effects Division, U.S.EPA, Washington, D.C.	2000
87865	Pentachlorophenol	Monhystera disjuncta	Nematode	Worms	LC50	4	d	S	U	4,800	µg/L	SW	LAB	7215	Vranken, G., R. Vanderhaeghen, and C. Heip	Effects of Pollutants on Life-History Parameters of the Marine Nematode Monhystera disjuncta	ICES J.Mar.Sci. 48:325-334	1991
87865	Pentachlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	R	U	440	µg/L	SW	LAB	4894	Rao, K.R., F.R. Fox, P.J. Conklin, and A.C. Cantelmo	Comparative Toxicology and Pharmacology of Chlorophenols: Studies on the Grass Shrimp, Palaemonetes pugio	A.Calabrese, F.P.Thurberg, and W.B.Vernberg (Eds.), Biological Monitoring	1981
87865	Pentachlorophenol	Neanthes arenaceodentata	Polychaete worm	Worms	LC50	4	d	S	U	435	µg/L	SW	LAB	56537	Rubinstein, N.	Memorandum to S. Tagatz, U.S. EPA, Gulf Breeze, FL. Effect of PCP on Neanthes arenaceodentata	U.S.EPA, Gulf Breeze, FL :2 p.	1981
87865	Pentachlorophenol	Gammarus tigrinus	Scud	Crustaceans	LC50	4	d	R	U	371	µg/L	SW	LAB	3033	Kierstead, W.G., and F. Barlocher	Ecological Effects of Pentachlorophenol on the Brackish-Water Amphipod Gammarus tigrinus	Arch.Hydrobiol. 115(1):149-156	1989
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	4	d	R	U	362	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Ensis minor	Jackknife clam	Molluscs	LC50	4	d	F	M	344	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	4	d	NR	M	450	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Penaeus aztecus	Brown shrimp	Crustaceans	LC50	4	d	NR	NR	195	µg/L	SW	LAB	49012	U.S.Environmental Protection Agency	Semi-Annual Report. April -September 1976	Semi-Annual Rep., U.S.EPA, Gulf Breeze, FL :51 p.	1976
87865	Pentachlorophenol	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	270	µg/L	SW	LAB	5185	Linden, E., B.E. Bengtsson, O. Svanberg, and G. Sundstrom	and Pesticide Formulations Against Two Brackish Water Organisms, the Bleak (Alburnus alburnus) and the Harpacticoid Nitocra spinipes	8(11/12):843-851 (Author Communication Used) (OECDG Data	1979
87865	Pentachlorophenol	Monopylephorus cuticulatus	Tubificid	Worms	LC50	4	d	R	U	750	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982

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87865	Pentachlorophenol	Neanthes succinea	Clam worm	Worms	LC50	4	d	F	M	672	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Stylodrilus heringianus	Oligochaete	Worms	LC50	4	d	R	U	800	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Limnodriloides verrucosus	Oligochaete	Worms	LC50	4	d	R	U	780	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	4	d	NR	M	620	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Dinophilus gyrociliatus	Archiannelid	Worms	LC50	4	d	R	U	612	µg/L	SW	LAB	11940	Carr, R.S., M.D. Curran, and M. Mazurkiewicz	Evaluation of the Archiannelid Dinophilus gyrociliatus for Use in Short-Term Life-Cycle Toxicity Tests	Environ.Toxicol.Chem. 5(7):703-712	1986
87865	Pentachlorophenol	Limnodrilus hoffmeisteri	Tubificid worm, Oligochaete	Worms	LC50	4	d	R	U	600	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Mulinia lateralis	Clam	Molluscs	LC50	4	d	F	M	482	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	4	d	R	M	600	µg/L	SW	LAB	6435	Hooftman, R.N., and G.J. Vink	The Determination of Toxic Effects of Pollutants with the Marine Polychaete Worm Ophryotrocha diadema	Ecotoxicol.Environ.Saf. 4(3):252-262	1980
87865	Pentachlorophenol	Limnodriloides verrucosus	Oligochaete	Worms	LC50	4	d	R	U	500	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	NR	NR	515	µg/L	SW	LAB	49012	U.S.Environmental Protection Agency	Semi-Annual Report. April -September 1976	Semi-Annual Rep., U.S.EPA, Gulf Breeze, FL :51 p.	1976
87865	Pentachlorophenol	Tubifex tubifex	Tubificid worm	Worms	LC50	4	d	R	U	540	µg/L	SW	LAB	10602	Chapman, P.M., M.A. Farrell, and R.O. Brinkhurst	Relative Tolerances of Selected Aquatic Oligochaetes to Combinations of Pollutants and Environmental Factors	Aquat.Toxicol. 2(1):69-78	1982
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	4	d	NR	M	550	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	7	d	NR	M	4,500	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Palaemonetes varians	Grass or Atlantic ditch shrimp	Crustaceans	LC50	7	d	NR	M	5,800	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Crangon crangon	Common shrimp, sand shrimp	Crustaceans	LC50	7	d	NR	M	5,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	7	d	NR	M	11,000	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981

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87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	7	d	NR	M	420	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	7	d	NR	M	280	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Mytilus edulis	Common bay mussel,blue mussel	Molluscs	LC50	7	d	NR	M	950	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	7	d	NR	U	300	µg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
87865	Pentachlorophenol	Crepidula fornicata	Slipper limpet	Molluscs	LC50	7	d	NR	M	460	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Crassostrea virginica	American or virginia oyster	Molluscs	LC50	14	d	R	U	71	µg/L	SW	LAB	2400	Davis, H.C., and H. Hidu	Effects of Pesticides on Embryonic Development of Clams and Oysters and on Survival and Growth of the Larvae	Fish.Bull. 67(2):393-404	1969
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	14	d	NR	M	9,500	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	14	d	NR	M	210	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	14	d	NR	M	210	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Mytilus edulis	Common bay mussel,blue mussel	Molluscs	LC50	14	d	NR	M	750	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	21	d	NR	M	180	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	21	d	NR	M	180	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	28	d	NR	M	4,400	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	28	d	NR	M	300	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	28	d	NR	M	280	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	30	d	NR	M	300	µg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981

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87865	Pentachlorophenol	Ophryotrocha diadema	Polychaete	Worms	LC50	41	d	NR	M	280	μg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
87865	Pentachlorophenol	Chaetogammarus marinus	Amphipod	Crustaceans	LC50	56	d	NR	M	180	μg/L	SW	LAB	15149	Adema, D.M.M., and G.J. Vink	1,1,2-Trichloroethane, Dieldrin, Pentacholorophenol, and 3,4-Dichloroaniline for Marine and Fresh Water Organisms	Chemosphere 10(6):533-554 (OECDG Data File)	1981
88062	2,4,6-Trichlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	M	5,600	μg/L	SW	LAB	3163	Burton, D.T., and D.J. Fisher	Zinc, Ammonia, 3,3'-Dichlorobenzidine, 2,6-Dichloro-4-Nitroaniline, Methylene Chloride, and 2,4,6-Trichlorophenol to Juvenile Grass Shrimp and Killifish	Bull.Environ.Contam. Toxicol. 44(5):776-783	1990
88062	2,4,6-Trichlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	R	U	1,210	μg/L	SW	LAB	4894	Rao, K.R., F.R. Fox, P.J. Conklin, and A.C. Cantelmo	Comparative Toxicology and Pharmacology of Chlorophenols: Studies on the Grass Shrimp, Palaemonetes pugio	A.Calabrese, F.P.Thurberg, and W.B.Vernberg (Eds.), Biological Monitoring	1981
88062	2,4,6-Trichlorophenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	4	d	R	M	2,700	μg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
88062	2,4,6-Trichlorophenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	4	d	R	M	3,900	μg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
88062	2,4,6-Trichlorophenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	R	U	3,950	μg/L	SW	LAB	4894	Rao, K.R., F.R. Fox, P.J. Conklin, and A.C. Cantelmo	Comparative Toxicology and Pharmacology of Chlorophenols: Studies on the Grass Shrimp, Palaemonetes pugio	A.Calabrese, F.P.Thurberg, and W.B.Vernberg (Eds.), Biological Monitoring	1981
88755	2-Nitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	0.5	d	NR	U	11,000	μg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
88755	2-Nitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	6,500	μg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
88755	2-Nitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	6,500	μg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
88755	2-Nitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	2	d	NR	U	2,100	μg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
88755	2-Nitrophenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	4	d	R	M	32,900	μg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
88755	2-Nitrophenol	Artemia salina	Brine shrimp	Crustaceans	LC50	7	d	NR	U	900	μg/L	SW	LAB	16436	Barahona, M.V., and S. Sanchez-Fortun	Comparative Sensitivity of Three Age Classes of Artemia salina Larvae to Several Phenolic Compounds	Bull.Environ.Contam. Toxicol. 56(2):271-278	1996
95487	2-Methylphenol	Elasmopus pectinicrus	Scud	Crustaceans	LC50	1	d	R	U	16,000	μg/L	SW	LAB	5013	Lee, W.Y., and J.A.C. Nicol	Individual and Combined Toxicity of Some Petroleum Aromatics to the Marine Amphipod Elasmopus pectenicrus	Mar.Biol. 48(3):215-222	1978
95487	2-Methylphenol	Elasmopus pectinicrus	Scud	Crustaceans	LC50	2	d	R	U	11,800	μg/L	SW	LAB	5013	Lee, W.Y., and J.A.C. Nicol	Individual and Combined Toxicity of Some Petroleum Aromatics to the Marine Amphipod Elasmopus pectenicrus	Mar.Biol. 48(3):215-222	1978
95487	2-Methylphenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	2.458333333	d	R	M	14,200	μg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979

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95487	2-Methylphenol	Elasmopus pectinicrus	Scud	Crustaceans	LC50	4	d	R	U	10,200	µg/L	SW	LAB	5013	Lee, W.Y., and J.A.C. Nicol	Individual and Combined Toxicity of Some Petroleum Aromatics to the Marine Amphipod Elasmopus pectenicrus	Mar.Biol. 48(3):215-222	1978
95501	1,2-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	M	14,300	µg/L	SW	LAB	875	Curtis, M.W., T.L. Copeland, and C.H. Ward	Acute Toxicity of 12 Industrial Chemicals to Freshwater and Saltwater Organisms	Water Res. 13(2):137-141	1979
95501	1,2-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	M	10,300	µg/L	SW	LAB	875	Curtis, M.W., T.L. Copeland, and C.H. Ward	Acute Toxicity of 12 Industrial Chemicals to Freshwater and Saltwater Organisms	Water Res. 13(2):137-141	1979
95501	1,2-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	M	10,000	µg/L	SW	LAB	2965	Curtis, M.W., and C.H. Ward	Aquatic Toxicity of Forty Industrial Chemicals: Testing in Support of Hazardous Substance Spill Prevention Regulation	J.Hydrol. 51:359-367(Author Communication Used)	1981
95501	1,2-Dichlorobenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	1,970	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
95501	1,2-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	M	9,400	µg/L	SW	LAB	875	Curtis, M.W., T.L. Copeland, and C.H. Ward	Acute Toxicity of 12 Industrial Chemicals to Freshwater and Saltwater Organisms	Water Res. 13(2):137-141	1979
95501	1,2-Dichlorobenzene	Mercenaria mercenaria	Northern quahog or hard clam	Molluscs	LC50	12	d	R	U	100,000	µg/L	SW	LAB	2400	Davis, H.C., and H. Hidu	Effects of Pesticides on Embryonic Development of Clams and Oysters and on Survival and Growth of the Larvae	Fish.Bull. 67(2):393-404	1969
95578	2-Chlorophenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	4	d	R	M	5,300	µg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
100414	Ethylbenzene	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	1	d	S	U	16,000	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	1	d	S	U	40,000	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	22,100	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	17,300	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	17,300	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	14,400	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	10,200	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	1	d	F	M	5,200	µg/L	SW	LAB	4189	Masten, L.W., R.L. Boeri, and J.D. Walker	Stategies Employed to Determine the Acute Aquatic Toxicity of Ethyl Benzene, a Highly Volatile, Poorly Water-Soluble Chemical	Ecotoxicol.Environ.Saf. 27(3):335-348	1994

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100414	Ethylbenzene	Crangon franciscorum	Bay shrimp	Crustaceans	LC50	1	d	S	M	2,200	µg/L	SW	LAB	558	Benville, P.E.Jr., and S. Korn	The Acute Toxicity of Six Monocyclic Aromatic Crude Oil Components to Striped Bass (Morone saxatilis) and Bay Shrimp (Crago franciscorum)	Calif.Fish Game 63(4):204-209	1977
100414	Ethylbenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	14,500	µg/L	SW	LAB	7800	Potera, G.T.	The Effects of Benzene, Toluene and Ethylbenzene on Several Important Members of the Estuarine Ecosystem	Ph.D.Thesis, Lehigh University, Bethlehem, PA :108 p.	1975
100414	Ethylbenzene	Cancer magister	Dungeness or edible crab	Crustaceans	LC50	2	d	S	M	40,000	µg/L	SW	LAB	5035	Caldwell, R.S., E.M. Caldarone, and M.H. Mallon	of Cook Inlet Crude Oil and Its Major Aromatic Components on Larval Stages of the Dungeness Crab, Cancer magister Dana	Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems	1977
100414	Ethylbenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	2	d	F	M	5,200	µg/L	SW	LAB	4189	Masten, L.W., R.L. Boeri, and J.D. Walker	Stategies Employed to Determine the Acute Aquatic Toxicity of Ethyl Benzene, a Highly Volatile, Poorly Water-Soluble Chemical	Ecotoxicol.Environ.Saf. 27(3):335-348	1994
100414	Ethylbenzene	Crassostrea gigas	Pacific oyster	Molluscs	LC50*	2	d	S	U	373,000	µg/L	SW	LAB	8621	Legore, R.S.	The Effect of Alaskan Crude Oil and Selected Hydrocarbon Compounds on Embryonic Development of the Pacfic Oyster, Crassostrea gigas	Washington, Seattle, WA:189 p.(1974) /Diss.Abstr.Int.B Sci.Eng. 35(7):3168	1975
100414	Ethylbenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	3	d	F	M	4,000	µg/L	SW	LAB	4189	Masten, L.W., R.L. Boeri, and J.D. Walker	Stategies Employed to Determine the Acute Aquatic Toxicity of Ethyl Benzene, a Highly Volatile, Poorly Water-Soluble Chemical	Ecotoxicol.Environ.Saf. 27(3):335-348	1994
100414	Ethylbenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	87,600	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
100414	Ethylbenzene	Crangon franciscorum	Bay shrimp	Crustaceans	LC50	4	d	S	M	490	µg/L	SW	LAB	558	Benville, P.E.Jr., and S. Korn	The Acute Toxicity of Six Monocyclic Aromatic Crude Oil Components to Striped Bass (Morone saxatilis) and Bay Shrimp (Crago franciscorum)	Calif.Fish Game 63(4):204-209	1977
100414	Ethylbenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	F	M	2,600	µg/L	SW	LAB	4189	Masten, L.W., R.L. Boeri, and J.D. Walker	Stategies Employed to Determine the Acute Aquatic Toxicity of Ethyl Benzene, a Highly Volatile, Poorly Water-Soluble Chemical	Ecotoxicol.Environ.Saf. 27(3):335-348	1994
100414	Ethylbenzene	Cancer magister	Dungeness or edible crab	Crustaceans	LC50	4	d	S	M	13,000	µg/L	SW	LAB	5035	Caldwell, R.S., E.M. Caldarone, and M.H. Mallon	of Cook Inlet Crude Oil and Its Major Aromatic Components on Larval Stages of the Dungeness Crab, Cancer magister Dana	Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems	1977
106467	1,4-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	M	129,200	µg/L	SW	LAB	875	Curtis, M.W., T.L. Copeland, and C.H. Ward	Acute Toxicity of 12 Industrial Chemicals to Freshwater and Saltwater Organisms	Water Res. 13(2):137-141	1979
106467	1,4-Dichlorobenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	1,990	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
106467	1,4-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	M	60,000	µg/L	SW	LAB	2965	Curtis, M.W., and C.H. Ward	Aquatic Toxicity of Forty Industrial Chemicals: Testing in Support of Hazardous Substance Spill Prevention Regulation	J.Hydrol. 51:359-367(Author Communication Used)	1981
106467	1,4-Dichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	M	69,000	µg/L	SW	LAB	875	Curtis, M.W., T.L. Copeland, and C.H. Ward	Acute Toxicity of 12 Industrial Chemicals to Freshwater and Saltwater Organisms	Water Res. 13(2):137-141	1979
108952	Phenol	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	0.875	d	R	M	7,500	µg/L	SW	LAB	5810	McLeese, D.W., V. Zitko, and M.R. Peterson	Structure-Lethality Relationships for Phenols, Anilines and Other Aromatic Compounds in Shrimp and Clams	Chemosphere 8(2):53-57 (OECDG Data File)	1979
108952	Phenol	Artemia salina	Brine shrimp	Crustaceans	LC50*	1	d	S	U	160,000	µg/L	SW	LAB	2408	Price, K.S., G.T. Waggy, and R.A. Conway	Brine Shrimp Bioassay and Seawater BOD of Petrochemicals	J.Water Pollut.Control Fed. 46(1):63-77	1974

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108952	Phenol	Katelysia opima	Marine bivalve	Molluscs	LC50	1	d	S	U	138,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	U	53,000	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	31,800,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	S	NR	6,900	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	1	d	S	M	53,000	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	99,900,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	52,200,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	50,500,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	34,600,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	1	d	S	U	105,000,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Tetrahymena pyriformis	Ciliate	Invertebrates	LC50	1	d	S	NR	600,000	µg/L	SW	LAB	9812	Roberts, R.O., and S.G. Berk	Development of a Protozoan Chemoattraction Bioassay for Evaluating Toxicity of Aquatic Pollutants	Toxic.Assess. 5:279-292	1990
108952	Phenol	Brachionus plicatilis	Rotifer	Invertebrates	LC50	1	d	S	NR	400,000	µg/L	SW	LAB	16539	Snell, T.W., B.D. Moffat, C. Janssen, and G. Persoone	Acute Toxicity Tests Using Rotifers. III. Effects of Temperature, Strain, and Exposure Time on the Sensitivity of Brachionus plicatilis	Environ.Toxicol.Water Qual. 6:63-75	1991
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	NR	NR	3,650	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	S	NR	3,510	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Mysida	Opossum shrimp order	Crustaceans	LC50	1	d	S	U	2,000	µg/L	SW	LAB	3416	Luk'yanenko, V.I., S.A. Cherkashin, and P.A. Kandinskiy	Behavior of Juvenile Fish and Mysids in Solutions of Organic Toxicants	Hydrobiol.J. 23(4):65-70	1987
108952	Phenol	Acartia clausi	Calanoid copepod	Crustaceans	LC50	1	d	S	U	32,269	µg/L	SW	LAB	17298	Buttino, I.	Phenol and Ammonia on Egg Production Rates, Fecal Pellet Production and Egg Viability of the Calanoid Copepod	Mar.Biol. 119(4):629-634	1994

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108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	S	NR	31,310	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Artemia salina	Brine shrimp	Crustaceans	LC50	1	d	NR	U	28,200	µg/L	SW	LAB	17289	D. Rossel, J. Tarradellas, H. Meyer, H. Saiah, P. Vogel, C. Delisle, and C. Blaise	Cyst-Based Ecotoxicological Tests Using Anostracans: Comparison of Two Species of Streptocephalus	Environ.Toxicol.Water Qual. 9(4):317-326	1994
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	S	NR	20,770	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	1	d	S	NR	14,870	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	1	d	S	U	14,400	µg/L	SW	LAB	14256	Buikema, A.L.J., B.R. Niederlehner, and J. Cairns Jr.	The Effects of a Simulated Refinery Effluent and Its Components on the Estuarine Crustacean, Mysidopsis bahia	Arch.Environ.Contam.Toxicol. 10:231-240	1981
108952	Phenol	Pandalus montagui	Aesop shrimp	Crustaceans	LC50	2	d	R	U	175,000	µg/L	SW	LAB	906	Portmann, J.E., and K.W. Wilson	The Toxicity of 140 Substances to the Brown Shrimp and Other Marine Animals	Leaflet No.22 (2nd Ed.), Ministry of Agric.Fish.Food, Fish.Lab.Burnham-on-	1971
108952	Phenol	Katelysia opima	Marine bivalve	Molluscs	LC50	2	d	S	U	128,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
108952	Phenol	Artemia salina	Brine shrimp	Crustaceans	LC50*	2	d	S	U	56,000	µg/L	SW	LAB	2408	Price, K.S., G.T. Waggy, and R.A. Conway	Brine Shrimp Bioassay and Seawater BOD of Petrochemicals	J.Water Pollut.Control Fed. 46(1):63-77	1974
108952	Phenol	Carcinus maenas	Green or Europeon shore crab	Crustaceans	LC50	2	d	R	U	56,000	µg/L	SW	LAB	906	Portmann, J.E., and K.W. Wilson	The Toxicity of 140 Substances to the Brown Shrimp and Other Marine Animals	Leaflet No.22 (2nd Ed.), Ministry of Agric.Fish.Food, Fish.Lab.Burnham-on-	1971
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	27,500,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	50,900,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	49,400,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	38,400,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	26,000,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Cerastoderma edule	Cockle	Molluscs	LC50	2	d	S	U	330,000	µg/L	SW	LAB	9258	Portmann, J.E.	Results of Acute Toxicity Tests with Marine Organisms, Using a Standard Method	Marine Pollution and Sea Life, FAO, Rome, Italy / Fishing News (Books) Ltd.,	1972
108952	Phenol	Ophryotrocha diadema	Polychaete	Worms	LC50	2	d	S	U	215,000	µg/L	SW	LAB	10890	Parker, J.G.	The Effects of Selected Chemicals and Water Quality on the Marine Polychaete Ophryotrocha diadema	Water Res. 18(7):865-868	1984

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108952	Phenol	Crangon crangon	Common shrimp, sand shrimp	Crustaceans	LC50	2	d	S	U	21,500	µg/L	SW	LAB	9258	Portmann, J.E.	Results of Acute Toxicity Tests with Marine Organisms, Using a Standard Method	Marine Pollution and Sea Life, FAO, Rome, Italy / Fishing News (Books) Ltd.,	1972
108952	Phenol	Cerastoderma edule	Cockle	Molluscs	LC50	2	d	R	U	500,000	µg/L	SW	LAB	906	Portmann, J.E., and K.W. Wilson	The Toxicity of 140 Substances to the Brown Shrimp and Other Marine Animals	Leaflet No.22 (2nd Ed.), Ministry of Agric.Fish.Food, Fish.Lab.Burnham-on-	1971
108952	Phenol	Artemia sp.	Brine shrimp	Crustaceans	LC50	2	d	S	U	36,000,000	µg/L	SW	LAB	16031	Espiritu, E.Q., C.R. Janssen, and G. Persoone	Cyst-Based Toxicity Tests. VII. Evaluation of the 1-h Enzymatic Inhibition Test (Fluotox) with Artemia nauplii	Environ.Toxicol.Water Qual. 10:25-34	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	S	NR	3,480	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	S	NR	6,810	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	S	NR	1,450	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	S	NR	800	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	NR	NR	19,470	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Crangon crangon	Common shrimp, sand shrimp	Crustaceans	LC50	2	d	R	U	23,500	µg/L	SW	LAB	906	Portmann, J.E., and K.W. Wilson	The Toxicity of 140 Substances to the Brown Shrimp and Other Marine Animals	Leaflet No.22 (2nd Ed.), Ministry of Agric.Fish.Food, Fish.Lab.Burnham-on-	1971
108952	Phenol	Macrobrachium rosenbergii	Giant river prawn	Crustaceans	LC50	2	d	F	M	19,480	µg/L	SW	LAB	18007	Law, A.T., and M.E. Yeo	Toxicity of Phenol on Macrobrachium rosenbergii (de Man) Eggs, Larvae, and Post-Larvae	Bull.Environ.Contam. Toxicol. 58(3):469-474	1997
108952	Phenol	Macrobrachium rosenbergii	Giant river prawn	Crustaceans	LC50	2	d	F	M	16,460	µg/L	SW	LAB	18007	Law, A.T., and M.E. Yeo	Toxicity of Phenol on Macrobrachium rosenbergii (de Man) Eggs, Larvae, and Post-Larvae	Bull.Environ.Contam. Toxicol. 58(3):469-474	1997
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	2	d	S	NR	13,650	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	2	d	S	U	12,800	µg/L	SW	LAB	14256	Buikema, A.L.J., B.R. Niederlehner, and J. Cairns Jr.	The Effects of a Simulated Refinery Effluent and Its Components on the Estuarine Crustacean, Mysidopsis bahia	Arch.Environ.Contam.Toxicol. 10:231-240	1981
108952	Phenol	Macrobrachium rosenbergii	Giant river prawn	Crustaceans	LC50	2	d	F	M	11,830	µg/L	SW	LAB	18007	Law, A.T., and M.E. Yeo	Toxicity of Phenol on Macrobrachium rosenbergii (de Man) Eggs, Larvae, and Post-Larvae	Bull.Environ.Contam. Toxicol. 58(3):469-474	1997
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	U	11,000	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	2	d	S	M	11,000	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978

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108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50*	2	d	NR	U	20,000	µg/L	SW	LAB	9002	Tatem, H.E., and J.W. Anderson	The Toxicity of Four Oils to Palaemonetes pugio (Holthuis) in Relation to Uptake and Retention of Specific Petroleum Hydrocarbons	Am.Zool. 13(4):1307-1308	1973
108952	Phenol	Katelysia opima	Marine bivalve	Molluscs	LC50	3	d	S	U	122,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	7,880	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	6,020	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	1,350	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	970	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	490	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	3	d	S	NR	2,240	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Gammarus duebeni	Scud	Crustaceans	LC50	4	d	F	M	183,200	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Saduria entomon	Aquatic sowbug	Crustaceans	LC50	4	d	F	M	176,800	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Katelysia opima	Marine bivalve	Molluscs	LC50	4	d	S	U	117,000	µg/L	SW	LAB	9017	Dange, A.D., and V.B. Masurekar	Hydrocarbons to the Estuarine Fish Therapon jarbua (Forsskal) and the Estuarine Clam Katelysia opima (Gmelin)	Proc.Symp.Coastal Aquacult. 3:828-832	1984
108952	Phenol	Saduria entomon	Aquatic sowbug	Crustaceans	LC50	4	d	F	M	186,200	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Gammarus duebeni	Scud	Crustaceans	LC50	4	d	F	M	89,500	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Ampelisca abdita	Amphipod	Crustaceans	LC50	4	d	R	U	66,500	µg/L	SW	LAB	14592	Redmond, M.S., and K.J. Scott	Acute Toxicity Tests with Phenol	U.S.EPA, Narragansett, RI :3	1987
108952	Phenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	4	d	S	U	53,500	µg/L	SW	LAB	6057	Stainken, D.M.	The Effect of a No. 2 Fuel Oil and a South Louisiana Crude Oil on the Behavior of the Soft Shell Clam, Mya arenaria L.	Bull.Environ.Contam. Toxicol. 16(6):724-729	1976
108952	Phenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	4	d	S	U	565,000	µg/L	SW	LAB	6057	Stainken, D.M.	The Effect of a No. 2 Fuel Oil and a South Louisiana Crude Oil on the Behavior of the Soft Shell Clam, Mya arenaria L.	Bull.Environ.Contam. Toxicol. 16(6):724-729	1976

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108952	Phenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	4	d	S	U	365,000	µg/L	SW	LAB	6057	Stainken, D.M.	The Effect of a No. 2 Fuel Oil and a South Louisiana Crude Oil on the Behavior of the Soft Shell Clam, Mya arenaria L.	Bull.Environ.Contam. Toxicol. 16(6):724-729	1976
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	1,490	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Panopeus herbstii	Common mud crab	Crustaceans	LC50	4	d	R	U	52,800	µg/L	SW	LAB	12942	Key, P.B., and G.I. Scott	Lethal and Sublethal Effects of Chlorine, Phenol, and Chlorine-Phenol Mixtures on the Mud Crab, Panopeus herbstii	Environ.Health Perspect. 69:307-312	1986
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	U	5,800	µg/L	SW	LAB	19953	Tatem, H.E.	The Toxicity and Physiological Effects of Oil and Petroleum Hydrocarbons on Estuarine Grass Shrimp Palaemonetes pugio (Holthuis)	Ph.D.Thesis, Texas A&M University, College Station, TX :133 p.	1975
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	4,530	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	2,710	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	710	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	560	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Archaeomysis kokuboi	Mysid	Crustaceans	LC50	4	d	S	NR	260	µg/L	SW	NR	19779	Kim, J.S., and P. Chin	Acute and Chronic Toxicity of Phenol to Mysid, Archaeomysis kokuboi	Bull.Korean Fish.Soc.(Han'Guk Susan Halchoiji) 28(1):87-97	1995
108952	Phenol	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	M	5,800	µg/L	SW	LAB	420	Tatem, H.E., B.A. Cox, and J.W. Anderson	The Toxicity of Oils and Petroleum Hydrocarbons to Estuarine Crustaceans	Estuar.Coast.Mar.Sci. 6(4):365-373	1978
108952	Phenol	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	S	U	12,500	µg/L	SW	LAB	14256	Buikema, A.L.J., B.R. Niederlehner, and J. Cairns Jr.	The Effects of a Simulated Refinery Effluent and Its Components on the Estuarine Crustacean, Mysidopsis bahia	Arch.Environ.Contam .Toxicol. 10:231-240	1981
108952	Phenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	7	d	S	U	53,500	µg/L	SW	LAB	6057	Stainken, D.M.	The Effect of a No. 2 Fuel Oil and a South Louisiana Crude Oil on the Behavior of the Soft Shell Clam, Mya arenaria L.	Bull.Environ.Contam. Toxicol. 16(6):724-729	1976
108952	Phenol	Mya arenaria	Sand gaper, soft shell clam	Molluscs	LC50	7	d	S	U	450,000	µg/L	SW	LAB	6057	Stainken, D.M.	The Effect of a No. 2 Fuel Oil and a South Louisiana Crude Oil on the Behavior of the Soft Shell Clam, Mya arenaria L.	Bull.Environ.Contam. Toxicol. 16(6):724-729	1976
108952	Phenol	Mercenaria mercenaria	Northern quahog or hard clam	Molluscs	LC50	12	d	R	U	55,000	µg/L	SW	LAB	2400	Davis, H.C., and H. Hidu	Effects of Pesticides on Embryonic Development of Clams and Oysters and on Survival and Growth of the Larvae	Fish.Bull. 67(2):393-404	1969
108952	Phenol	Saduria entomon	Aquatic sowbug	Crustaceans	LC50	14	d	F	M	100,500	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Saduria entomon	Aquatic sowbug	Crustaceans	LC50	14	d	F	M	85,800	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979

ECOTOX Output of Marine Acute Toxicity Data for Groundwater Chemicals of Concern (USEPA 2007)*
*Chlorobenzene data presented in Appendix A

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Endpoint	Exposure Duration (Days)	Duration Units (Days)	Exposure Type	Chemical Analysis	Concentration	Conc Units (µg/L)	Media Type	Test Location	Reference Number	Author	Title	Source	Publication Year
108952	Phenol	Gammarus duebeni	Scud	Crustaceans	LC50	21	d	F	M	41,000	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
108952	Phenol	Gammarus duebeni	Scud	Crustaceans	LC50	21	d	F	M	32,500	µg/L	SW	LAB	5285	Oksama, M., and R. Kristoffersson	The Toxicity of Phenol to Phoxinus phoxinus, Gammarus duebeni, and Mesidotea entomon in Brackish Water	Ann.Zool.Fenn. 16(3):209-216	1979
117817	1,2-Benzenedicarboxylic acid, bis(2-Ethylhexyl)ester	Ampelisca abdita	Amphipod	Crustaceans	LC50	4	d	R	M	1,000	µg/L	SW	LAB	17582	Ho, K.T., R.A. McKinney, A. Kuhn, M.C. Pelletier, and R.M. Burgess	Identification of Acute Toxicants in New Bedford Harbor Sediments	Environ.Toxicol.Chem. 16(3):551-558	1997
117817	1,2-Benzenedicarboxylic acid, bis(2-Ethylhexyl)ester	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	R	M	1,000	µg/L	SW	LAB	17582	Ho, K.T., R.A. McKinney, A. Kuhn, M.C. Pelletier, and R.M. Burgess	Identification of Acute Toxicants in New Bedford Harbor Sediments	Environ.Toxicol.Chem. 16(3):551-558	1997
117817	1,2-Benzenedicarboxylic acid, bis(2-Ethylhexyl)ester	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	300,000	µg/L	SW	LAB	5185	Linden, E., B.E. Bengtsson, O. Svanberg, and G. Sundstrom	and Pesticide Formulations Against Two Brackish Water Organisms, the Bleak (Alburnus alburnus) and the Harpacticoid Nitocra spinipes	8(11/12):843-851 (Author Communication Used) (OECDG Data	1979
117817	1,2-Benzenedicarboxylic acid, bis(2-Ethylhexyl)ester	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	1,000,000	µg/L	SW	LAB	10905	Bengtsson, B.E., and M. Tarkpea	The Acute Aquatic Toxicity of Some Substances Carried by Ships	Mar.Pollut.Bull. 14(6):213-214	1983
120821	1,2,4-Trichlorobenzene	Acartia tonsa	Calanoid copepod	Crustaceans	LC50	4	d	S	U	2,100	µg/L	SW	LAB	14563	Horne, J.D., M.A. Swirsky, T.A. Hollister, B.R. Oblad, and J.H. Kennedy	5Aquatic Toxicity Studies of Five Priority Pollutants	Report, EPA Contract No.68-01-6201, NUS Corp., Houston, TX :196 p.	1983
120821	1,2,4-Trichlorobenzene	Branchiostoma caribaeum	Caribbean lancelet	Miscellaneous	LC50	4	d	F	U	5,750	µg/L	SW	LAB	2484	Clark, J.R., J.M. Patrick Jr., J.C. Moore, and E.M. Lores	Toxicities of Six Organic Chemicals to Grass Shrimp (Palaemonetes pugio) and Amphioxus (Branchiostoma caribaeum)	Arch.Environ.Contam.Toxicol. 16(4):401-407	1987
120821	1,2,4-Trichlorobenzene	Neanthes arenaceodentata	Polychaete worm	Worms	LC50	4	d	S	U	4,700	µg/L	SW	LAB	14563	Horne, J.D., M.A. Swirsky, T.A. Hollister, B.R. Oblad, and J.H. Kennedy	5Aquatic Toxicity Studies of Five Priority Pollutants	Report, EPA Contract No.68-01-6201, NUS Corp., Houston, TX :196 p.	1983
120821	1,2,4-Trichlorobenzene	Crangon septemspinosa	Bay shrimp, Sand shrimp	Crustaceans	LC50	4	d	S	U	90	µg/L	SW	LAB	14563	Horne, J.D., M.A. Swirsky, T.A. Hollister, B.R. Oblad, and J.H. Kennedy	5Aquatic Toxicity Studies of Five Priority Pollutants	Report, EPA Contract No.68-01-6201, NUS Corp., Houston, TX :196 p.	1983
120821	1,2,4-Trichlorobenzene	Leptosynapta inhaerens	Sea cucumber	Invertebrates	LC50	4	d	F	M	2,400	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
120821	1,2,4-Trichlorobenzene	Corophium acherusicum	Scud	Crustaceans	LC50	4	d	F	M	1,100	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
120821	1,2,4-Trichlorobenzene	Armandia maculata	Polychaete or Opheliid worm	Worms	LC50	4	d	F	M	930	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
120821	1,2,4-Trichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	S	U	900	µg/L	SW	LAB	14563	Horne, J.D., M.A. Swirsky, T.A. Hollister, B.R. Oblad, and J.H. Kennedy	5Aquatic Toxicity Studies of Five Priority Pollutants	Report, EPA Contract No.68-01-6201, NUS Corp., Houston, TX :196 p.	1983
120821	1,2,4-Trichlorobenzene	Laevicardium mortoni	Morton's egg cockle	Molluscs	LC50	4	d	F	M	890	µg/L	SW	LAB	7410	Tagatz, M.E., and R.S. Stanley	Sensitivity Comparisons of Estuarine Benthic Animals Exposed to Toxicants in Single Species Acute Tests and Community Tests	EPA 600/X-87/167, U.S.EPA, Gulf Breeze, FL :16 p.	1987
120821	1,2,4-Trichlorobenzene	Palaemonetes pugio	Daggerblade grass shrimp	Crustaceans	LC50	4	d	F	U	540	µg/L	SW	LAB	2484	Clark, J.R., J.M. Patrick Jr., J.C. Moore, and E.M. Lores	Toxicities of Six Organic Chemicals to Grass Shrimp (Palaemonetes pugio) and Amphioxus (Branchiostoma caribaeum)	Arch.Environ.Contam.Toxicol. 16(4):401-407	1987

ECOTOX Output of Marine Acute Toxicity Data for Groundwater Chemicals of Concern (USEPA 2007)*
*Chlorobenzene data presented in Appendix A

CAS Number	Chemical Name	Species Scientific Name	Species Common Name	Species Group	Endpoint	Exposure Duration (Days)	Duration Units (Days)	Exposure Type	Chemical Analysis	Concentration	Conc Units (µg/L)	Media Type	Test Location	Reference Number	Author	Title	Source	Publication Year
120821	1,2,4-Trichlorobenzene	Gammarus annulatus	Scud	Crustaceans	LC50	4	d	S	U	500	µg/L	SW	LAB	14563	Horne, J.D., M.A. Swirsky, T.A. Hollister, B.R. Oblad, and J.H. Kennedy	5Aquatic Toxicity Studies of Five Priority Pollutants	Report, EPA Contract No.68-01-6201, NUS Corp., Houston, TX :196 p.	1983
120821	1,2,4-Trichlorobenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	450	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
120821	1,2,4-Trichlorobenzene	Nitocra spinipes	Harpacticoid copepod	Crustaceans	LC50	4	d	S	U	2,600	µg/L	SW	LAB	10905	Bengtsson, B.E., and M. Tarkpea	The Acute Aquatic Toxicity of Some Substances Carried by Ships	Mar.Pollut.Bull. 14(6):213-214	1983
218019	Chrysene	Artemia salina	Brine shrimp	Crustaceans	LC50	0.125	d	S	U	3,000	µg/L	SW	LAB	63236	Kagan, J., E.D. Kagan, I.A. Kagan, and P.A. Kagan	Do Polycyclic Aromatic Hydrocarbons, Acting as Photosensitizers, Participate in the Toxic Effects of Acid Rain?	R.G.Zika (Eds.), Photochemistry of Environmental Aquatic Systems,	1987
218019	Chrysene	Neanthes arenaceodentata	Polychaete worm	Worms	LC50	4	d	S	M	1,000	µg/L	SW	LAB	5053	Rossi, S.S., and J.M. Neff	Toxicity of Polynuclear Aromatic Hydrocarbons to the Polychaete Neanthes arenaceodentata	Mar.Pollut.Bull. 9(8):220-223	1978
541731	1,3-Dichlorobenzene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	2,850	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978
542756	1,3-Dichloro-1-propene	Americamysis bahia	Opossum shrimp	Crustaceans	LC50	4	d	NR	U	790	µg/L	SW	LAB	9607	U.S.Environmental Protection Agency	In-Depth Studies on Health and Environmental Impacts of Selected Water Pollutants	U.S.EPA Contract No.68-01-4646, Duluth, MN :9 p.	1978

APPENDIX C

HAZARD QUOTIENT AND HAZARD INDEX CALCULATION BASED ON GROUNDWATER DATA FROM SHORELINE MONITORING WELLS

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	CAS	SCV[b] (µg/L)	# of Detections	Mean HQ	Max HQ	Well ID / Date	MW-01 11/5/2008	MW-01 10/13/2011	MW-01 2/21/2012	MW-01 7/23/2012	MW-01A 11/6/2008	MW-01A 10/13/2011	MW-01A 2/21/2012	MW-01A 7/23/2012	MW-02 11/12/2008	MW-02 10/6/2011	MW-02 2/22/2012
TCL VOCs (µg/L)																	
Benzene	71-43-2	5003	59	0.03	0.3												0.00007
Bromoform	75-25-2	2546	0														
Chloroethane	75-00-3	NA	13														
Chloroform	67-66-3	NA	47								NA	NA	NA	NA	NA		
cis-1,3-Dichloropropene	10061-01-5	NA	0														
Ethylbenzene	100-41-4	1238	50	0.1	2												
Methylene chloride	75-09-2	16666	16	0.0005	0.005												
trans-1,3-Dichloropropene	10061-02-6	NA	0														
Trichlorofluoromethane	75-69-4	NA	2														
1,2-Dichloroethane	107-06-2	NA	48														
1,1,2,2-Tetrachloroethane	79-34-5	NA	11														
Tetrachloroethene	127-18-4	NA	36									NA	NA	NA	NA	NA	NA
Toluene	108-88-3	NA	50														
1,1,2-Trichloroethane	79-00-5	NA	21														
Trichloroethene	79-01-6	NA	67								NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	75-01-4	NA	21														
Xylenes (total)	1330-20-7	NA	47														
TCL SVOCs (µg/L)																	
1,2,4-Trichlorobenzene	120-82-1	109	20	0.3	2												
1,2-Dichlorobenzene	95-50-1	1182	35	0.05	0.7												
1,3-Dichlorobenzene	541-73-1	290	7	0.01	0.07												
1,4-Dichlorobenzene	106-46-7	3212	46	0.07	0.8											0.003	
2,4,6-Trichlorophenol	88-06-2	309	1	0.003	0.003												
2,4-Dinitrophenol	51-28-5	2896	0														
2-Chlorophenol	95-57-8	530	14	0.08	1												
2-Methylphenol	95-48-7	1286	9	0.1	2												
2-Nitrophenol	88-75-5	554	5	0.6	2												
4-Chloro-3-methylphenol	59-50-7	NA	0														
Aniline	62-53-3	NA	9														
bis(2-Chloroethoxy)methane	111-91-1	NA	3														
bis(2-Chloroisopropyl)ether	39638-32-9	NA	0														
bis(2-Ethylhexyl)phthalate	117-81-7	NA	1														
Butylbenzylphthalate	85-68-7	NA	0														
Chrysene	218-01-9	173	3	0.01	0.04						0.004						
Diethylphthalate	84-66-2	NA	4														
Di-n-butylphthalate	84-74-2	NA	1														
Pentachlorophenol	87-86-5	81	5	0.2	0.4												
Phenol	108-95-2	8400	4	0.04	0.2												
1,1'-Biphenyl	92-52-4	NA	6														
bis(2-Chloroethyl)ether	111-44-4	NA	16														
4-Chloroaniline	106-47-8	NA	8								NA						
Naphthalene	91-20-3	NA	21														
Hazard Index											0.004					0.003	0.00007

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

	MW-02	**MW-02A**	**MW-02A**	**MW-02A**	**MW-02A**	**MW-07**	**MW-07**	**MW-07**	**MW-07**	**MW-07A**	**MW-07A (AVG)**	**MW-07A (AVG)**	**MW-07A**	**MW-08**	**MW-08**
Parameter	**7/25/2012**	**11/12/2008**	**10/12/2011**	**2/24/2012**	**7/25/2012**	**11/10/2008**	**10/5/2011**	**2/24/2012**	**7/31/2012**	**11/3/2008**	**10/4/2011**	**2/24/2012**	**7/25/2012**	**11/11/2008**	**10/6/2011**
TCL VOCs (µg/L)															
Benzene							0.003	0.009	0.007						
Bromoform															
Chloroethane															
Chloroform		NA		NA						NA	NA	NA			
cis-1,3-Dichloropropene															
Ethylbenzene															
Methylene chloride														0.0005	
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane								NA	NA	NA		NA			
1,1,2,2-Tetrachloroethane										NA					
Tetrachloroethene	NA	NA			NA					NA		NA	NA		
Toluene								NA	NA						
1,1,2-Trichloroethane															
Trichloroethene	NA	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA		
Vinyl Chloride															
Xylenes (total)															
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene								0.01							
1,2-Dichlorobenzene						0.01	0.006	0.008							
1,3-Dichlorobenzene															
1,4-Dichlorobenzene						0.02	0.01	0.01	0.02						
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol														0.009	
2-Methylphenol															
2-Nitrophenol															
4-Chloro-3-methylphenol															
Aniline														NA	NA
bis(2-Chloroethoxy)methane															
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene															
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol														0.2	
Phenol															
1,1'-Biphenyl						NA									
bis(2-Chloroethyl)ether															
4-Chloroaniline														NA	NA
Naphthalene															
Hazard Index						0.03	0.02	0.04	0.03					0.3	

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

	MW-08	MW-08	MW-8A	MW-8A	MW-8A	MW-8A	MW-14	MW-14	MW-14	MW-14	MW-14A (AVG)	MW-14A	MW-14A	MW-14A	MW-14C
Parameter	**2/21/2012**	**7/23/2012**	**11/3/2008**	**10/5/2011**	**2/21/2012**	**7/23/2012**	**11/5/2008**	**10/4/2011**	**2/27/2012**	**7/27/2012**	**11/5/2008**	**10/7/2011**	**2/29/2012**	**7/31/2012**	**11/5/2008**
TCL VOCs (µg/L)															
Benzene	0.002			0.0006			0.003	0.001	0.002	0.003	0.02	0.006	0.01	0.01	
Bromoform															
Chloroethane															
Chloroform		NA	NA		NA	NA					NA			NA	NA
cis-1,3-Dichloropropene															
Ethylbenzene							0.004	0.0008	0.003	0.005	0.004		0.002	0.002	
Methylene chloride	0.0002	0.0006									0.005				
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane			NA		NA	NA					NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane			NA		NA								NA		NA
Tetrachloroethene			NA			NA							NA	NA	
Toluene		NA					NA	NA	NA	NA	NA		NA	NA	
1,1,2-Trichloroethane											NA		NA	NA	NA
Trichloroethene			NA	NA	NA	NA					NA		NA	NA	NA
Vinyl Chloride													NA	NA	
Xylenes (total)							NA	NA	NA	NA			NA	NA	
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene											0.2	0.3	0.4	0.3	
1,2-Dichlorobenzene				0.0008							0.2	0.02	0.09	0.06	
1,3-Dichlorobenzene											0.01		0.01		
1,4-Dichlorobenzene											0.3	0.04	0.1	0.1	
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol											0.003		0.003		
2-Methylphenol															
2-Nitrophenol															
4-Chloro-3-methylphenol															
Aniline	NA					NA									
bis(2-Chloroethoxy)methane															
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene															
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol	0.2												0.01		
Phenol															
1,1'-Biphenyl											NA				
bis(2-Chloroethyl)ether											NA				
4-Chloroaniline						NA									
Naphthalene							NA			NA	NA		NA	NA	
Hazard Index	0.2	0.0006		0.001			0.007	0.002	0.005	0.008	0.7	0.3	0.7	0.4	

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	MW-14C 10/4/2011	MW-14C 2/24/2012	MW-14C 7/24/2012	MW-15 11/5/2008	MW-15 10/12/2011	MW-15 2/23/2012	MW-15 7/24/2012	MW-15A 11/5/2008	MW-15A 10/7/2011	MW-15A 2/22/2012	MW-15A 8/1/2012	MW-16 11/5/2008	MW-16 10/6/2011	MW-16 2/23/2012	MW-16 7/30/2012
TCL VOCs (µg/L)															
Benzene				0.003		0.003	0.001	0.02		0.02	0.03	0.1	0.1	0.1	0.05
Bromoform															
Chloroethane											NA				
Chloroform		NA	NA				NA	NA	NA	NA	NA				
cis-1,3-Dichloropropene															
Ethylbenzene				0.002		0.001	0.0004	0.005		0.004	0.01	0.07	0.08	0.1	0.07
Methylene chloride						0.00002									
trans-1,3-Dichloropropene															
Trichlorofluoromethane														NA	NA
1,2-Dichloroethane			NA				NA	NA	NA	NA	NA				
1,1,2,2-Tetrachloroethane										NA	NA				
Tetrachloroethene										NA	NA				
Toluene						NA	NA	NA		NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA					NA		NA	NA				
Trichloroethene	NA	NA	NA					NA		NA	NA				
Vinyl Chloride								NA		NA	NA				
Xylenes (total)				NA		NA	NA			NA	NA	NA	NA	NA	NA
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene								0.06	0.2	0.2	0.2				
1,2-Dichlorobenzene				0.09		0.002	0.001	0.1	0.07	0.1	0.09	0.006		0.006	
1,3-Dichlorobenzene				0.002							0.01				
1,4-Dichlorobenzene				0.04		0.001	0.0008	0.2	0.1	0.2	0.2	0.004		0.004	0.008
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol												0.01			
2-Methylphenol				0.001				0.0005			0.008	0.02	0.01		
2-Nitrophenol															
4-Chloro-3-methylphenol															
Aniline				NA							NA	NA	NA		
bis(2-Chloroethoxy)methane								NA							
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene															
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol															
Phenol				0.01											
1,1'-Biphenyl								NA	NA						
bis(2-Chloroethyl)ether															
4-Chloroaniline													NA		
Naphthalene							NA	NA	NA	NA	NA	NA			
Hazard Index				0.2		0.007	0.004	0.4	0.4	0.5	0.5	0.2	0.2	0.2	0.1

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	MW-16A	MW-16A	MW-16A	MW-16A (AVG)	MW-16C	MW-16C	MW-16C	MW-16C	MW-17	MW-17	MW-17	MW-17	MW-18R	MW-18R	MW-18R
	11/6/2008	**10/6/2011**	**2/29/2012**	**8/1/2012**	**11/4/2008**	**10/6/2011**	**2/23/2012**	**7/23/2012**	**11/4/2008**	**10/4/2011**	**2/27/2012**	**7/26/2012**	**11/4/2008**	**10/4/2011**	**2/22/2012**
TCL VOCs (µg/L)															
Benzene	0.02	0.03	0.05	0.04					0.006	0.007	0.008	0.009	0.002	0.002	0.002
Bromoform															
Chloroethane			NA	NA							NA	NA			
Chloroform				NA	NA			NA		NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene															
Ethylbenzene			0.01	0.008					0.09	0.05	0.1	0.07	0.1	0.08	0.05
Methylene chloride											0.00008		0.0003		0.00002
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane	NA	NA	NA	NA					NA	NA	NA	NA			NA
1,1,2,2-Tetrachloroethane				NA											
Tetrachloroethene			NA	NA								NA			
Toluene			NA	NA					NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA		NA	NA						NA	NA	NA			
Trichloroethene			NA	NA	NA		NA	NA			NA	NA			NA
Vinyl Chloride			NA	NA				NA			NA				
Xylenes (total)			NA	NA					NA	NA	NA	NA	NA	NA	NA
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene	0.1	0.2	0.3	0.3											
1,2-Dichlorobenzene	0.08	0.1	0.2	0.1											
1,3-Dichlorobenzene	0.009														
1,4-Dichlorobenzene	0.1	0.2	0.3	0.3		0.003									
2,4,6-Trichlorophenol									0.003						
2,4-Dinitrophenol															
2-Chlorophenol									0.02		0.02	0.01	0.02		
2-Methylphenol									0.0005						
2-Nitrophenol									2			0.8	0.3		0.2
4-Chloro-3-methylphenol															
Aniline															
bis(2-Chloroethoxy)methane															
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene															
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol									0.07						
Phenol															
1,1'-Biphenyl		NA													
bis(2-Chloroethyl)ether	NA		NA												
4-Chloroaniline													NA		
Naphthalene	NA	NA	NA	NA											
Hazard Index	0.3	0.6	0.8	0.7		0.003			2	0.05	0.1	0.9	0.5	0.08	0.3

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	MW-18R (AVG) 7/26/2012	MW-18AR 11/3/2008	MW-18AR 10/4/2011	MW-18AR 2/22/2012	MW-18AR 7/23/2012	MW-27 11/3/2008	MW-27 (AVG) 10/11/2011	MW-27 2/27/2012	MW-27 7/30/2012	MW-28 11/6/2008	MW-28 10/6/2011	MW-28 3/1/2012	MW-28 7/30/2012	MW-28A 11/6/2008	MW-28A 10/5/2011
TCL VOCs (µg/L)															
Benzene	0.002					0.002		0.003	0.003	0.002		0.003	0.003		
Bromoform															
Chloroethane								NA	NA						
Chloroform		NA		NA	NA								NA	NA	
cis-1,3-Dichloropropene															
Ethylbenzene	0.03			0.004		0.01		0.02	0.01	2	2	2	2		
Methylene chloride								0.00007				0.00007	0.0002		
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane	NA					NA	NA	NA	NA	NA		NA	NA		
1,1,2,2-Tetrachloroethane														NA	
Tetrachloroethene	NA														
Toluene	NA					NA		NA	NA	NA	NA	NA	NA		
1,1,2-Trichloroethane								NA							
Trichloroethene	NA							NA				NA		NA	
Vinyl Chloride						NA		NA	NA	NA		NA			
Xylenes (total)	NA			NA		NA		NA	NA	NA	NA	NA	NA		
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene															
1,2-Dichlorobenzene								0.0009							
1,3-Dichlorobenzene															
1,4-Dichlorobenzene	0.0003					0.002		0.001			0.002				
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol										1				0.002	
2-Methylphenol										0.003					
2-Nitrophenol	0.2														
4-Chloro-3-methylphenol															
Aniline										NA					
bis(2-Chloroethoxy)methane						NA			NA						
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate										NA					
Butylbenzylphthalate															
Chrysene										0.04					
Diethylphthalate				NA						NA				NA	
Di-n-butylphthalate										NA					
Pentachlorophenol										0.4					
Phenol										0.02					
1,1'-Biphenyl															
bis(2-Chloroethyl)ether						NA	NA	NA	NA	NA			NA		
4-Chloroaniline															
Naphthalene						NA				NA					
Hazard Index	0.2			0.004		0.01		0.02	0.02	4	2	2	2	0.002	

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

	MW-28A	MW-28A (AVG)	MW-29	MW-29	MW-29 (AVG)	MW-29	MW-29A	MW-29A	MW-29A	MW-29A	MW-37	MW-37	MW-37	MW-37	MW-38
Parameter	**2/21/2012**	**7/24/2012**	**11/6/2008**	**10/10/2011**	**2/22/2012**	**7/26/2012**	**11/6/2008**	**10/18/2011**	**2/22/2012**	**7/26/2012**	**11/10/2008**	**10/5/2011**	**2/23/2012**	**7/25/2012**	**11/6/2008**
TCL VOCs (µg/L)															
Benzene															
Bromoform															
Chloroethane															
Chloroform		NA	NA				NA	NA	NA	NA	NA	NA			
cis-1,3-Dichloropropene															
Ethylbenzene															
Methylene chloride															
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane	NA	NA											NA		
1,1,2,2-Tetrachloroethane											NA		NA		
Tetrachloroethene			NA	NA	NA	NA	NA			NA	NA			NA	NA
Toluene															
1,1,2-Trichloroethane															
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride															
Xylenes (total)															
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene															
1,2-Dichlorobenzene			0.0004								0.002				
1,3-Dichlorobenzene															
1,4-Dichlorobenzene			0.0004								0.003				
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol															
2-Methylphenol															
2-Nitrophenol															
4-Chloro-3-methylphenol															
Aniline															
bis(2-Chloroethoxy)methane															
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene			0.002												
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol															
Phenol															
1,1'-Biphenyl															
bis(2-Chloroethyl)ether						NA									
4-Chloroaniline															
Naphthalene															
Hazard Index			0.003								0.004				

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	MW-38 (AVG) 10/10/2011	MW-38 2/21/2012	MW-38 7/24/2012	MW-41 11/3/2008	MW-41 (AVG) 10/5/2011	MW-41 3/1/2012	MW-41 7/31/2012	MW-42 (AVG) 11/10/2008	MW-42 10/14/2011	MW-42 2/29/2012	MW-42 8/3/2012	MW-43 11/3/2008	MW-43 10/7/2011	MW-43 2/23/2012	MW-43 7/25/2012
TCL VOCs (µg/L)															
Benzene					0.002		0.002			0.007	0.003		0.0002	0.0003	
Bromoform															
Chloroethane															
Chloroform										NA					
cis-1,3-Dichloropropene															
Ethylbenzene						0.0009				0.0007		0.2			
Methylene chloride						0.00002						0.0006			
trans-1,3-Dichloropropene															
Trichlorofluoromethane															
1,2-Dichloroethane										NA	NA		NA	NA	
1,1,2,2-Tetrachloroethane															
Tetrachloroethene										NA	NA				
Toluene					NA					NA		NA			
1,1,2-Trichloroethane															
Trichloroethene							NA			NA	NA			NA	
Vinyl Chloride														NA	NA
Xylenes (total)						NA				NA		NA			
TCL SVOCs (µg/L)															
1,2,4-Trichlorobenzene								0.01	0.3	0.4					
1,2-Dichlorobenzene					0.01			0.1	0.05	0.08	0.04				
1,3-Dichlorobenzene										0.01					
1,4-Dichlorobenzene				0.0001	0.02			0.2	0.08	0.1	0.06				
2,4,6-Trichlorophenol															
2,4-Dinitrophenol															
2-Chlorophenol								0.008							
2-Methylphenol												0.002			
2-Nitrophenol															
4-Chloro-3-methylphenol															
Aniline															
bis(2-Chloroethoxy)methane															
bis(2-Chloroisopropyl)ether															
bis(2-Ethylhexyl)phthalate															
Butylbenzylphthalate															
Chrysene															
Diethylphthalate															
Di-n-butylphthalate															
Pentachlorophenol															
Phenol												0.0003			
1,1'-Biphenyl															
bis(2-Chloroethyl)ether															NA
4-Chloroaniline															
Naphthalene												NA			
Hazard Index				0.0001	0.04	0.0009	0.002	0.3	0.4	0.6	0.1	0.2	0.0002	0.0003	

Hazard Quotient and Hazard Index
Calculation Based on Groundwater Data from
Shoreline Monitoring Wells[a]

Parameter	MW-43A 11/11/2008	MW-43A 10/7/2011	MW-43A 3/1/2012	MW-43A 8/2/2012	MW-44 11/5/2008	MW-44 10/4/2011	MW-44 2/28/2012	MW-44 7/27/2012	MW-45 11/6/2008	MW-45 10/11/2011	MW-45 2/28/2012	MW-45 7/30/2012
TCL VOCs (µg/L)												
Benzene		0.02	0.06	0.01	0.01	0.05	0.04	0.03	0.008	0.01	0.02	0.01
Bromoform												
Chloroethane			NA	NA					NA	NA	NA	NA
Chloroform												
cis-1,3-Dichloropropene												
Ethylbenzene	0.1	0.01	0.02	0.008	0.008	0.03	0.03	0.02	0.06	0.08	0.1	0.1
Methylene chloride										0.00006	0.00008	0.00004
trans-1,3-Dichloropropene												
Trichlorofluoromethane												
1,2-Dichloroethane			NA	NA					NA	NA	NA	NA
1,1,2,2-Tetrachloroethane												
Tetrachloroethene			NA	NA								NA
Toluene	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane									NA	NA	NA	NA
Trichloroethene			NA	NA						NA	NA	
Vinyl Chloride			NA						NA	NA	NA	NA
Xylenes (total)	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
TCL SVOCs (µg/L)												
1,2,4-Trichlorobenzene	0.2	0.2		0.4					0.005			
1,2-Dichlorobenzene	0.2	0.2	0.7	0.2				0.003	0.008			
1,3-Dichlorobenzene	0.01											
1,4-Dichlorobenzene	0.3	0.3	0.8	0.4	0.001			0.002	0.01	0.006	0.01	0.01
2,4,6-Trichlorophenol												
2,4-Dinitrophenol												
2-Chlorophenol	0.08		0.1		0.002							
2-Methylphenol	0.003											
2-Nitrophenol												
4-Chloro-3-methylphenol												
Aniline												
bis(2-Chloroethoxy)methane												
bis(2-Chloroisopropyl)ether												
bis(2-Ethylhexyl)phthalate												
Butylbenzylphthalate												
Chrysene												
Diethylphthalate	NA											
Di-n-butylphthalate												
Pentachlorophenol												
Phenol					0.0002							
1,1'-Biphenyl	NA											
bis(2-Chloroethyl)ether	NA			NA					NA	NA		NA
4-Chloroaniline					NA			NA				
Naphthalene									NA	NA	NA	
Hazard Index	0.9	0.7	2	1	0.02	0.07	0.07	0.05	0.1	0.09	0.1	0.1

Notes:
AVG = Average with duplicate
HQ = Hazard Quotient
NA = Screening value not available
SCV = Screening Value
SVOC = Semivolatile Organic Compounds
TCL = Target Compound List
VOC = Volatile Organic Compounds

[a] Analysis based on shoreline wells that are representative of potential groundwater discharge. Well located in the Site interior were excluded from the analysis. These wells include: MW-3, MW-3A, MW-4, MW-5, MW-9, MW-9A, MW-10, MW-11, MW-12, MW-12A, MW-13, MW-13A, MW-13C, MW-13D, MW-30, MW-30A, MW-31, MW-31A, MW-32, MW-32A, MW-33, MW-33A, MW-34, AND MW-35.

[b] Screening values are conservative secondary chronic values adapted from USEPA's 1991 ambient water quality guidelines.